

Research Development & Grant Writing News

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Table of Contents

- [Topics of Interest URLs](#)
- [Avoid the Research Misconduct Perp Walk](#)
- [Non-Faculty Researchers and Broader Impacts](#)
- [CAREER: The Importance of Focus](#)
- [US Army Medical Research Acquisition Activity](#)
- [Post-Shutdown Startup](#)
- [How to go from Research Ideas to Research Dollars--Ten Key Steps to Getting Your Ideas Funded](#) (Reprinted from June 15, 2013)
- [Research Grant Writing Web Resources](#)
- [Educational Grant Writing Web Resources](#)
- [Agency Research News](#)
- [Agency Reports, Workshops & Roadmaps](#)
- [New Funding Opportunities](#)
- [About Academic Research Funding Strategies](#)

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Research Development & Grant Writing News

Topics of Interest URLs

(Back to [Page 1](#))

[NSF Growing Convergence Research \(GCR\)](#)

[Dear Colleague Letter Supporting the Re-Entry of Women and Women Veterans in the STEM Workforce through](#)

[NSF INCLUDES](#)

[A Science of Science Policy Approach to Analyzing and Innovating the Biomedical Research Enterprise](#)

[\(SCISIPBIO\)](#)

[Department of Energy to Provide \\$30 Million for New Data Science Approaches for Chemistry and Materials](#)

[Research](#)

[New DOE policies would block many foreign research collaborations](#)

[ADVANCE Program - Proposal Preparation Technical Assistance Webinar](#)

[Important Notice No. 145: Resumption of Operations at the National Science Foundation](#)

[Grant and Cooperative Agreement-Related Policy and Systems Issues Following the Resumption of Operations at the National Science Foundation](#)

[DOE Announces Notice of Intent to Issue a Funding Opportunity Establishing a Cybersecurity Institute for Energy](#)

[Efficient Manufacturing](#)

[Graduate Research Fellowship in the Social and Behavioral Sciences](#)

The National Academies' [Climate Communications Initiative](#) has released a [new strategic plan](#) that will guide its efforts going forward.

[Roundup of R15 Academic Research Enhancement Award \(AREA\) and Research Enhancement Award Program](#)

[\(REAP\) Resources](#)

[Tips for Great Grant Writing, Part 1: What is NIH Looking For?](#)

[Harnessing the Data Revolution \(HDR\) Big Idea](#)

[NEON ecological laboratory at risk, fired advisers warn NSF after shake-up](#)

[Digest of Education Statistics 2017](#)

[Science Agencies Grappling with Shutdown Aftermath](#)

[Long-Term Infrastructure Program Letter Report: January 30, 2019](#)

[NIH Year in Reflection 2018](#)

[Trump to launch artificial intelligence initiative, but many details lacking](#)

[Statement on executive order to maintain American leadership in artificial intelligence](#)

[White House Order Prioritizes U.S. Artificial Intelligence \(AI\) Research](#)

[DoD Combat Casualty Care Research BAA: Multi-Domain Lifesaving Trauma Innovations MuLTI Award - preproposal](#)

[Assuring the Integrity of Peer Review \(2017\)](#)

[Do Reviewers Read References? And if so Does It Impact Their Scores?](#)

[Curling up with a New NIH Data Book](#)

[End of U.S. shutdown won't mean return to business as usual for research agencies](#)

[The Emotional Toll of Graduate School](#)

[Genomics-Based Research Will Help Develop Crops for Bioenergy](#)

[Undergraduate Field Experiences Research Network \(U-FERN\)](#)

[NSF/CASIS Collaboration on Transport Phenomena Research on the International Space Station \(ISS\) to Benefit Life on Earth](#)

[Grants to Museums, Organizations for Native American Graves Protection and Repatriation](#)

[Enhancing the Postdoctoral Experience for Scientists and Engineers: A Guide for Postdoctoral Scholars, Advisers, Institutions, Funding Organizations, and Disciplinary Societies](#)

[Sloan Foundation call for letters of inquiry: sensor technologies to monitor energy or environmental systems](#)

[Statues of Easter Island may have marked fresh water](#)

[State Government R&D Expenditures Increase 7% in FY 2017; Health-Related R&D Up 13%](#)

[Mysterious human relatives moved into 'penthouse' Siberian cave 100,000 years earlier than thought](#)

[Periodic table still influencing today's research](#)

URLs Continue Next Page

Research Development & Grant Writing News

[How exercise may protect against Alzheimer's](#)
[New NIH research policy seeks greater inclusion across lifespan](#)
[US Government Escalates Opposition to Chinese Talent Recruitment Programs](#)
[Applications for New Awards; College Assistance Migrant Program](#)
[Agency Information Collection Activities; Submission to the Office of Management and Budget for Review and Approval; Comment Request; Carl D. Perkins Career and Technical Education Act State Plan](#)
[Applications for New Awards; Education Innovation and Research \(EIR\) Program-Expansion Grants](#)
[DARPA Measuring Biological Aptitude - Personal Performance Biomarkers](#)
[NEH Institutes for Advanced Topics in the Digital Humanities](#)
[NIJ Forensic Science Research and Development Symposium, 2019](#)
[Minority Serving Institutions: America's Underutilized Resource for Strengthening the STEM Workforce](#)
[New patent win for University of California upends CRISPR legal battle](#)
[Department of Energy to Provide \\$30 Million for New Data Science Approaches for Chemistry and Materials Research](#)
[House Science Committee Debuts New Leadership](#)
[Science and Engineering for Grades 6-12: Investigation and Design at the Center](#)
[Long-Term Infrastructure Program Letter Report: January 30, 2019](#)
[Notice for the All of Us Research Program Engagement and Retention Innovators Funding Opportunity and Informational Webinar](#)
[Number of Women with U.S. Doctorates in Science, Engineering, or Health Employed in the United States More Than Doubles since 1997](#)
[Survey of Doctorate Recipients, 2017](#)
[ADVANCE Program - proposal preparation technical assistance webinar](#)
[University of Texas lacks authority to revoke PhDs, judge rules](#)
[Is it time for a new research integrity board in the U.S.?](#)
[The case of the reviewer who said cite me or I won't recommend acceptance of your work](#)
[Are Intellectuals Suffering a Crisis of Meaning?](#)
[What Happens When You Read Science Writing by Women](#)

How to Avoid the Research Misconduct Perp Walk

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By Mike Cronan, co-publisher

[\(Back to Page 1\)](#)

NSF is the funding source for approximately 25% of all federally supported basic research conducted by U.S. colleges and universities. This support is accomplished with a budget of approximately \$7.7 billion (FY 2018). It would be hard to find a university or college of any size that does not look to NSF for funding STEM research and education programs. It would not be an exaggeration to state that NSF is the most important federal funding agency to most institutions of higher education for both basic research and STEM education, given the scope and scale of its funding from seven agency directorates that span many university colleges and departments.

While NIH is also a major funder to many institutions, that funding is much more narrowly targeted than NSF funding. Moreover, for new and junior faculty seeking tenure and promotion or for associate-level faculty seeking promotion to full professor, NSF is a mainstay for funding the types of research universities use to externally validate the quality of faculty research across multiple disciplines.

Given this, it is notable that this current *NSF Office of Inspector General Semiannual Report to Congress* (April 1 - September 30, 2018) [National Science Foundation Office of Inspector General NSF-OIG-SAR-59](#), the 59th semiannual report issued over the past 29 years, ***continues to publicly out faculty wrong doers, and, in some cases, research administrators, for research misconduct, plagiarism, fiscal malfeasance***, etc. associated with submitting NSF proposals..

As NSF notes, “NSF's Research Misconduct regulation is found at [45 CFR 689](#). Research misconduct means fabrication, falsification, or plagiarism in proposing or performing research funded by NSF, reviewing research proposals submitted to NSF, or in reporting research results funded by NSF.”

While the poster child for research misconduct and fiscal malfeasance continues to be the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs, there is also sufficient research misconduct related to proposal narratives (plagiarism, data falsification, attribution issues, etc.) to ensnarl new and junior faculty and even graduate students in career-ending audits by the OIG.

Moreover, given the cautionary warnings on research misconduct and the resultant public perp walks of violators described every six months in these OIG reports, it remains somewhat surprising that every six months a new cast of research misconduct perpetrators appears, held up to public shaming.

Of course, some of the violations of research misconduct are so egregious and purposeful that zero sympathy exists for the violators. But in many cases, especially for junior faculty and graduate students, the pitfalls of research misconduct might have been avoided by including in grant-writing workshops presentations using examples taken from NSF OIG reports. These can clarify what is and what is not plagiarism in the research narrative, standards of attribution, data integrity, etc.

Research Development & Grant Writing News

After all, NSF has been making clear for some time now and in various forums from workshops to Dear Colleague Letters (see OIG DCL [August 30, 2018](#)), that proposal narratives and narrative attachments are ***electronically checked for plagiarism in various manifestations against all prior proposals, funded or unfunded, submitted to the agency as well as other research publications, journals, theses, etc.*** Moreover, plagiarism runs the gamut from bold thievery to more nuanced instances related to proper references and attributions that can trip up all faculty, but particularly new and junior faculty or their graduate students. Anyone who has raised teenagers knows that some children are experiential learners refractory to cautionary tales, while others are open to being forewarned and thereby able to avoid the first kick of the mule, aka, an NSF OIG audit.

Plagiarism in the research narrative is one area where many faculty would benefit from research office workshops complemented by examples from the NSF report. It is worth noting that, in most prior OIG reports, some faculty have defended themselves against accusations of plagiarism by noting that copying without attribution or credit, or other forms of plagiarism, are considered acceptable practices in their home country.

In all cases, NSF OIG clarified that such an excuse would not fly with the agency and proceeded to outline the consequences for plagiarism, ranging from being debarred from submitting proposals to NSF to requiring a relevant research office to certify that any future proposals had been reviewed for plagiarism prior to submission. No academic researcher wants to find herself in this situation; it's therefore prudent to come up with a process to avoid being called out by an OIG audit. As NSF notes (emphasis added) "Pursuing allegations of research misconduct — plagiarism, data fabrication, and data falsification — by NSF-funded researchers ***continues to be a focus of our investigative work.***"

"During this reporting period," NSF reports (emphasis added), "***institutions took actions against individuals who committed research misconduct, including issuing letters of reprimand, suspending without pay, and dismissing a Ph.D. student.*** For each case described in this section, we ***recommended that NSF take significant actions against the individuals.***"

Illustrative examples quoted verbatim below from the report illustrate the above discussion (emphasis added):

"Assistant Professor Who Previously Committed Research Misconduct Falsified Data

An NSF funded PI falsified data contained in an NSF proposal. The university investigation committee concluded the ***PI intentionally and recklessly falsified data in one figure and recklessly fabricated data in a second figure.*** The university made a research misconduct finding against the PI but did not impose any sanctions because the PI resigned and departed the United States.

"We accepted the investigation committee's findings regarding the first figure. In a previous OIG case, NSF made a research misconduct finding against the PI regarding the second figure. Therefore, our report did not address the second figure. We concluded that the PI intentionally falsified data for the first figure in an awarded NSF proposal and failed to comply with the certification and assurance requirements imposed by NSF following the previous research misconduct finding. The PI also falsified data records related to the figure in a laboratory member's notebook.

Research Development & Grant Writing News

“We recommended that NSF make a finding of research misconduct and ***debar the PI for 5 years***. We also recommended that the ***PI be required to complete training in the responsible conduct of research*** (RCR). We further recommended that for 10 years from the date of the research misconduct finding, NSF should: require the PI to submit certifications and assurances for documents submitted to NSF; submit a detailed data management plan for proposals, with annual certifications in the case of awards; and bar the PI from participating as an NSF peer reviewer, advisor, or consultant.

“Graduate Student Falsified Data In Two Experiments

A graduate student whose research was supported by an NSF grant falsified data in two experiments, which misrepresented results of her research. Her advisor (and co-PI of the NSF grant) discovered the falsified data and reported it to the university. The university conducted an inquiry, during which the graduate student confessed to purposefully falsifying data in one experiment. ***The student subsequently left the university and ended all correspondence with the university.***

“The university concluded the student intentionally falsified and fabricated data in both experiments and committed research misconduct. It expelled her from the university and foreclosed her readmission. It also directed her advisor to retract a conference proceeding and a paper that relied upon her falsified data.

“Based on the evidence, we recommended NSF make a finding of research misconduct for falsification and ***debar the graduate student for 2 years***. We also recommended that NSF: require the graduate student to complete an RCR training program within 1 year of NSF’s finding; bar the graduate student from participating as an NSF peer reviewer, advisor, or consultant for 5 years; and, for 5 years, require certifications and assurances and require the graduate student to submit a detailed data management plan and to provide annual certifications that this plan is being implemented.

“Former NSF Program Officer Copied Part of Declined Proposal Into His Own

A former NSF program officer (PO) submitted an NSF proposal with portions of text copied from a previously declined NSF proposal for which he had served as the cognizant PO. He denied that he had kept a copy of the declined proposal after leaving NSF but did not offer a plausible explanation for the identical text contained in his proposal. We concluded the preponderance of evidence indicated the former PO knowingly used text from the declined proposal in his own proposal. Further, in his role as PO, the PI abused his NSF position and obtained confidential material, which he later impermissibly used for his own proposal.

We recommended that NSF make a finding of research misconduct, issue a letter of reprimand, require responsible conduct of research training, and ***debar the former PO for 1 year***. We also recommended his letter of reprimand include language addressing breach of PO confidentiality. Finally, we recommended ***NSF require certifications and assurances for 4 years and bar the PO from serving as an NSF peer reviewer, advisor, consultant, or Intergovernmental Personnel Act (IPA) rotator for 4 years.***”

“PI Falsified Letters of Support and Plagiarized In Proposals

Research Development & Grant Writing News

A PI plagiarized text in four NSF proposals and submitted falsified support letters from a collaborator with two of those proposals. During the university's investigation, the PI admitted to falsifying the collaborator's letter of support. He also admitted to modifying and reusing two additional letters of support from two other sources without permission. He submitted these falsified letters with two of the proposals. Based on the findings of their investigation, the university suspended the PI for 10 days without pay and required him to complete an online RCR course.

We concurred with the university that the PI included three falsified letters of support with two NSF proposals. As part of our investigation, we conducted an in-depth plagiarism review of the PI's recent NSF proposals and found the PI plagiarized text and one figure in four different proposals. We recommended that NSF make a finding of research misconduct and ***debar the PI for 1 year. We also recommended NSF bar the PI from participating as an NSF peer reviewer for 3 years and require the PI to submit certifications and assurances with each document submitted to NSF for 3 years.***

"PI Plagiarized Into NSF Proposal

A university investigation committee concluded the PI committed research misconduct when he plagiarized text into an NSF proposal. The university also concluded the PI and his graduate students engaged in a pattern of self-plagiarism in their published papers. Self-plagiarism is not research misconduct by NSF's definition; however, it can be a questionable research practice.

The university delayed the PI's tenure application for 1 year, assigned a faculty mentor to the PI, required him to take a RCR course and, for 3 years, required the PI to submit all proposals and manuscripts to the Office of the Associate Provost for review before submission to an agency or journal.

Based on the evidence, we recommended that NSF make a finding of research misconduct. We also recommended that NSF: require the PI to complete an RCR training program within 1 year; bar the PI from participating as an NSF peer reviewer, advisor, or consultant for NSF for 1 year; and for 1 year, require the PI provide a certification and assurance for each document (proposal, report, etc.) to which the PI contributes for submission to NSF."

In conclusion, this current OIG report and all past reports are on line as [pdf files at NSF](#) and represent a wealth of information that can be communicated to faculty with examples to inoculate them against being caught up in an NSF perp walk. As the old English proverb notes, "Being forewarned is being forearmed." Or more contemporaneously, as Speaker of the House Sam Rayburn noted, "There is no education in the second kick of the mule." Good advice when it comes to research misconduct.

Non-Faculty Researchers and Broader Impacts

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By Mike Cronan, co-publisher

[\(Back to Page 1\)](#)

Many researchers struggle with addressing the Broader Impacts (BI) requirement and similar requirements related to workforce development, education, and outreach at NSF and other federal research agencies. ***This struggle can be more acute for those researchers who do not hold faculty appointments but nonetheless*** are submitting proposals to NSF, NIH, and other funding agencies. For example, Colleges of Agriculture may have tenured or tenure-track faculty responsible for teaching, research, and service as well as other researchers without faculty appointments, whose research can be basic, applied, or applications based, depending on the position description. Similar positions often occur in colleges of engineering, science, medicine, veterinary medicine, etc., especially where research centers and institutes have been created that hire researchers in non-faculty positions.

Researchers in these non-faculty positions typically do not teach, although they may serve on graduate committees, and in general have a more tenuous engagement with research offices, which typically are the go-to place on campus for advice on writing the BI section of an NSF proposal. The advantage gained from working with research offices on a BI section can be considerable. Research offices have built a corporate memory of numerous configurations and activities of BI sections on proposals of all types submitted to NSF, from CAREERS to ERCs, among many others.

However, non-faculty researchers are often somewhat isolated from BI advice, or they may struggle to come up with a BI plan for an NSF proposal that makes sense both in the context of their research and in their geographic proximity to possible BI configurations, activities, and partnerships. This is especially the case for non-faculty researchers located at research centers and/or extension sites away from main campuses. This is often the situation of researchers in the agricultural disciplines whose primary funding home may be USDA/NIFA but who nonetheless may conduct research sufficiently basic to make funding from NSF a realistic possibility; e.g., a researcher funded under the USDA/NIFA *Specialty Crop Research Initiative* might also submit a proposal to the NSF [Plant Biotic Interactions](#) program in a research intersection area of interest to both agencies.

When it comes to BI, however, non-faculty researchers, particularly at sites apart from the main campus, need helpful advice about how best to structure the BI section of an NSF proposal, including advice on what NSF suggests in the [Proposal and Award Policy and Procedures Guide](#) (PAPPG) related to BI and [BI DCLs](#). Unfortunately, the PAPPG is a vastly underused resource for writing a competitive proposal to NSF, not just by non-faculty researchers but by many faculty as well.

Moreover, while BI is addressed in many forums online, for example the [National Alliance for Broader Impacts](#) publication, [Broader Impacts Guiding Principles and Questions for National Science Foundation Proposals](#), this information is communicated to non-faculty researchers in satellite research centers who write NSF proposals with varying degrees of success. ***In many cases, the most relevant BI advice to non-faculty researchers relates to identifying four types of relevant BI activities: those that (1) are not based on teaching,***

Research Development & Grant Writing News

mentoring, and research engagement of undergraduate and graduate students; (2) are small-scale programs that make sense within the budgetary constraints of smaller research grants; (3) are informed by strategies and protocols of BI partnership formation; and (4) correctly use the “language of BI,” such as the meaning of “evidence-based models,” “best practices,” “logic models,” “measurable outcomes, formative and summative evaluation protocols,” etc.

This challenge has no easy remedy, but one strategy calls for exploring BI activities in partnership with local and/or county organizations and associations that can help translate and disseminate research in relevant ways to the public, e.g., local science museums, science clubs, youth organizations, and other [informal science settings](#) (see [Principal Investigator's Guide: Managing Evaluation in Informal STEM Education Projects](#)). Two good articles can serve as a “how to” for creating informal science partnerships for BI. These are **described below in an excerpt from NSF's MSPnet** with brief summaries of the larger pdf file that can be downloaded for more detail (emphasis added):

[“So You Want to Share Your Science Connecting to the World of Informal Science Learning \(Download PDF here\)](#). Scientists can reap personal rewards through *collaborations with science and natural history museums, zoos, botanical gardens, aquaria, parks, and nature preserves*, and, while doing so, help to advance science literacy and **broaden participation in the natural sciences**. Beyond volunteer opportunities, which allow scientists to contribute their knowledge and passion within the context of existing programs and activities, there are also opportunities for scientists to bring their knowledge and resources to the ***design and implementation of new learning experiences for visitors to these informal science learning organizations*** (ISLOs). Well-designed education outreach plans that leverage the expertise and broad audiences of ISLOs can also enhance the prospects of research grant proposals made to agencies such as National Science Foundation, which encourage researchers to pay careful attention to the broader impacts of their research as well as its intellectual merit. Few scientists, however, have had the opportunity to become familiar with the pedagogy and design of informal or ‘free-choice’ science learning, and fewer still know how to go about the process of collaborating with ISLOs in developing and implementing effective programs, exhibits, and other learning experiences. This article, written by an experienced science museum professional, ***provides guidance for individual scientists and research groups interested in pursuing effective education outreach collaborations with science museums and other ISLOs***. When prospective partners begin discussions early in the proposal development process, they increase the likelihood of successful outcomes in funding, implementation, and impact. A strategic planning worksheet is provided, along with a carefully selected set of further resources to guide the design and planning of informal science learning experiences.”

[“Learning, Generalizing, and Local Sense-Making in Research–Practice Partnerships](#) *Science museums have made a concerted effort to work with researchers to incorporate current scientific findings and practices into informal learning opportunities for museum visitors*. Many of these efforts have focused on creating opportunities and support for researchers to interact face-to-face with the public through, for example, speaker series, community forums, and engineering competitions. ***However, there are other means by which practicing scientists can find a voice on the museum floor—through the design and***

Research Development & Grant Writing News

development of exhibits. Here we describe how researchers and museum professionals have worked together to create innovative exhibit experiences for an interactive science museum. For each example of scientists as (1) data providers, (2) advisors, and (3) co-developers, we highlight essential components for a successful partnership and pitfalls to avoid when collaborating on museum exhibits. Not many museums prototype and build their own exhibits like the Exploratorium. In those cases, there may be similar opportunities in more mediated offerings such as public demonstrations or lectures or in other formats that allow for direct interactions between scientists and visitors. We believe there are many opportunities for researchers to share natural phenomena, to advise on exhibit development and interpretation, to provide much needed materials, and to otherwise incorporate authentic research into the learning experiences at museums, no matter what the format.”

One advantage to informal science partnerships as referenced above for BI is that, in many cases, these partnerships are more easily configured than a formal science program with a school district and schools who likely operate under very prescriptive guidelines and standards for science education and contact with students and teachers.

As a concluding observation, it will be important for ***informal science partnerships for BI to understand NSF’s expectations for diversity and inclusion of underserved populations in any proposed BI activities.***

CAREER: The Importance of Focus

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By Lucy Deckard, co-publisher

(Back to [Page 1](#))

Note: This is one in a series of articles about the NSF CAREER. Many of the topics discussed also apply to other types of proposals, particularly those to other programs for early-career investigators.

Over more than 15 years of working with faculty on NSF CAREER proposals, some of the most common critiques we've seen CAREER PIs receive from reviewers are:

- The proposed project is too ambitious.
- The description of how the project will actually be done is vague. (This critique can also come in the form of lists of issues that were not addressed.)
- The reviewers are not convinced that the PI can do what s/he proposes.

These may seem to be separate issues, but they often stem from the same mistake: when scoping their research project, the PI went **broad and shallow** rather than **narrow and deep**. In other words, rather than focusing on one difficult and important problem in the field, the PI proposed to work on several difficult problems.

This is an easy mistake to make because CAREER PIs know that, in order to be competitive, they should propose research that is significant and ambitious. They therefore reason that they should propose to do a lot of work. Furthermore, many PIs are motivated by some grand challenge or ambitious goal that requires overcoming a number of difficult barriers. As a result, the PI plans a project to overcome all of those barriers and achieve that ambitious goal in 5 years.

The Problems with a Broad and Shallow Research Scope

It might seem logical to propose to address all of the key barriers or gaps to achieving an important goal or addressing a grand challenge, but there are several problems with this approach.

- **Increased risk.** Each important gap or barrier that a PI proposes to address brings some risk with it. If that PI then proposes to address several difficult gaps in one project, that multiplies the risk that the project will fail. By definition, CAREER PIs are early in their careers and don't yet have an extensive track record. Therefore, reviewers are less likely to give CAREER PIs the benefit of the doubt when assessing whether they can successfully navigate a project with risk piled on top of risk. Moreover, reviewers hate to recommend funding a project that is relatively likely to fail.
- **Lack of time.** Related to the risk issue, it's common for early-career faculty to underestimate the amount of time it takes to get things done. CAREER reviewers are typically more experienced faculty who, through hard experience, have a more realistic understanding of the rate of progress that can be expected when faculty have multiple responsibilities and are often dependent on students to do the bulk of the research tasks. While the 5 years allotted for CAREER projects may seem like a lot of time, funded PIs are often shocked by how quickly the

Research Development & Grant Writing News

time goes. Therefore, even if you can convince reviewers that you can accomplish the multiple difficult tasks you set out in your proposal, you may have a hard time convincing them you can accomplish those tasks in the 5-year project period.

- **Lack of room.** Even though most PIs would never consciously decide that they want to write a shallow proposal, **a broad scope usually leads to a shallow proposal** simply because there's not enough room to provide the information you need to cover. For each important gap you're proposing to address, you will need to 1) provide background on the state of the art and the literature regarding this issue, 2) describe your work to date on this issue and present preliminary data, 3) argue why your proposed approach will work when others have not been able to address the issue, and 4) provide a detailed plan for implementing your strategy and accomplishing that difficult thing. If you're proposing to do several different difficult things, you'll find you don't have enough room in the 15-page Project Description to make your argument effectively (especially considering the fact that you need room for a strong Education Plan). By the way, this is one reason that programs that fund projects with large scopes, such as Center-level programs, often allow significantly longer Project Descriptions.

How to Make the Argument for Significance When Going Narrow and Deep

We can hear you now, objecting that you've been counseled that a competitive CAREER proposal needs to propose something ambitious and significant. How can you do that if you have to narrow your scope? It is absolutely correct that your proposed research project needs to be significant, but the issue is, **how does NSF define significance?** Remember that NSF is interested in fundamental research and new knowledge. If you're able to present a strong, convincing, well-thought-out plan for addressing an important gap in your field that no one else has been able to address, that is significant.

So when you're trying to assess significance, ask yourself: 1) is this an **important** gap (or question or challenge) in my field with relevance beyond my specific application or topic? and 2) will my proposed plan address this gap **thoroughly**? That is, will I be developing fundamental understanding of underlying mechanisms or theory (or, for disciplines such as computer science, developing important new methods or algorithms that can be used more broadly)? One rule of thumb is, if successful, will the results of this project be publishable in the leading journal in my field?

All of this is not to say that you can't divide the gap you're addressing into a number of sub-problems or research questions. It's to say that you should avoid starting with a lofty goal or challenge and then proposing to address all of the different tough gaps or barriers to achieving that goal in your CAREER project.

So, how can you make sure what you're proposing is not too broad, but is still significant enough to excite your reviewers? Talk to your senior colleagues in the same general disciplines as you expect your reviewers to be in, and talk to your Program Officer. They can provide you with a reality check regarding whether reviewers are likely

Research Development & Grant Writing News

to be convinced that what you're proposing will make an important difference in your field while still being doable within the time available.

Leaving Some Issues for Future Research Is a Feature, Not a Bug

Remember, also, that the purpose of the CAREER is to set you up for an exciting line of research beyond the CAREER grant. One NSF Program Officer describe it this way: think of the CAREER project as the trunk of the tree, and the branches of the tree as the future lines of exciting research that will come out that project (and for which you will be the leader in your field). Therefore, it's a good thing if, after successfully completing your CAREER project, there are still important questions you will need to answer.

As part of your proposal, it's a good idea to put your CAREER project in context by clearly explaining what your long-term research goal is, what you've done so far, how the proposed CAREER project will provide significant advancement toward that goal, and what the next steps will be after successfully completing your CAREER project. However, be sure that it's clear to reviewers what you propose to accomplish as part of your CAREER project, as distinguished from what your future research directions will be beyond the CAREER project. You can do this by including a section near the end clearly labelled something like "Future Research Directions." This will ensure that reviewers don't confuse what you're proposing to do in the 5-year project with your long-term research agenda. It will also help to make the argument that this CAREER project will position you for years of exciting research at the frontiers of your discipline.

US Army Medical Research Acquisition Activity

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By Mike Cronan, co-publisher

[\(Back to Page 1\)](#)

The United States Army Medical Research and Materiel Command (USAMRMC) is the Army's medical materiel developer for medical research, development, and acquisition. Six USAMRMC medical research laboratories and institutes specialize in biomedical research, including infectious diseases, combat casualty care, operational medicine, clinical and rehabilitative medicine, chemical and biological defense, and combat dentistry. A large **extramural research program** and numerous cooperative research and development agreements of **interest to university researchers** provide research capacities in the following priority areas which are fully described in the program BAA and listed below:

- Military Infectious Diseases Research Program
- Combat Casualty Care Research Program
- Military Operational Medicine Research Program
- Clinical and Rehabilitative Medicine Research Program
- Medical Biological Defense Research Program
- Medical Chemical Defense Research Program
- Medical Simulation and Information Sciences Research Program
- Radiation Health Effects Research Program

Medical research funded under this program often applies to broad medical issues of public importance. For example, five funding opportunities related to breast cancer were posted several weeks ago with due dates in March and June:

- *DoD Breast Cancer, Breakthrough Fellowship Award* DOD-AMRAA posted 01/22/2019 due 03/28/2019
- *DoD Breast Cancer, Innovator Award* DOD-AMRAA posted 01/22/2019 due 06/13/2019
- *DoD Breast Cancer, Breakthrough Award Level 3* DOD-AMRAA posted 01/22/2019 due 06/13/2019
- *DoD Breast Cancer, Era of Hope Scholar Award* DOD-AMRAA posted 01/22/2019 due 03/28/2019
- *DoD Breast Cancer, Distinguished Investigator Award* DOD-AMRAA posted 01/22/2019 due 06/13/2019

The go-to place for submitting proposals under this program is the 98-page [DoD USAMRMC FY18-FY22 Broad Agency Announcement \(BAA\) for Extramural Medical Research](#) posted to Grants.gov, along with other funding opportunities under this program. This BAA is open until FY22, but note that when changes are made to the BAA, e.g., shift in priority research areas, the change will be posted at Grants.gov site for BAA W81XWH18SBAA1 under the "Version History" tab that represents a listing of modifications to the program. For example, Synopsis 2 was posted on October 17, 2018. The synopsis description (emphasis added) reads: "Most changes in this modified version are minor. However, **substantial changes**

Research Development & Grant Writing News

have been made in the following sections: II.A.3. Military Operational Medicine Research Program, I.a.9.iv Technology Requirements and Standards, and III. Military Operational Medicine Research Program.” As with any BAA open for a period of years, it is ***important to be aware of program modifications by checking the Grants.gov version history***, or, in many cases, signing up for email alerts from the agency sent when modifications to the program are made.

This BAA (W81XWH18SBAA1) provides a “general description of USAMRMC’s research and development programs, including Research Areas of Interest, evaluation and selection criteria, pre-proposal/pre-application and full proposal/application preparation instructions, and general administrative information. Specific submission information and additional administrative requirements can be found in the document titled ‘General Submission Instructions’ available in Grants.gov along with this BAA.”

Additionally, this BAA contains all the key information needed to submit a proposal, including award information, related to:

- funds available and anticipated number of awards;
- eligibility information;
- proposal/application submission information, such as content and form of the proposal/application submission for research awards;
- funding restrictions and due dates; and
- proposal/application review and selection information.

Submission of a pre-proposal/pre-application is required and must be submitted through eBRAP (<https://eBRAP.org/>). **If the USAMRMC is interested in receiving a full proposal/application, the PI will be sent an invitation via eBRAP to submit.** eBRAP is a multifunctional web-based system that allows PIs to submit their pre-proposals/pre-applications electronically through a secure connection, to view and edit the content of their pre-proposals/pre-applications and full proposals/applications, to receive communications from the CDMRP, and to submit documentation during award negotiations and period of performance.

Pre-proposals/Pre-applications may be submitted at any time prior to the BAA closing date. Pre-proposals/Pre-applications should describe specific ideas or projects that pertain to any of the areas described under “Program Description” in this BAA. ***A pre-proposal/pre-application must include a brief description of the scientific methods and design.***

This is a highly structured process requiring a very close reading of the BAA to make sure the applicant has complied with the submission process, but in general, the following format must be met:

- **Problem To Be Studied** (4,000 character limit, including spaces).
- **Theoretical Rationale, Scientific Methods, and Design** (4,000 character limit, including spaces).
- **Significance and/or Uniqueness of the Proposed Effort** (4,000 character limit, including spaces).
- **Military Relevance and Impact** (4,000 character limit, including spaces).
- **Brief Description of Research Involving Animals, Human Anatomical Substances and/or Human Subjects** (4,000 character limit, including spaces).

Research Development & Grant Writing News

- **Plans and Strategy for Translation, Implementation, and/or Commercialization** (4,000 character limit, including spaces).

Following the pre-proposal/pre-application screening, **PIs will be notified as to whether or not they are invited to submit full proposals/applications**; however, they **will not receive feedback** (e.g., a critique of strengths and weaknesses) on their pre-proposals/pre-applications. Within 120 days of submission, PIs should receive email notification via eBRAP regarding disposition of their pre-proposals/pre-applications.

If you are invited to submit a full proposal, it will be limited to 20 pages and must address the following:

“Background: Provide a brief statement of ideas and theoretical reasoning behind the proposed study. Describe previous experience most pertinent to this proposal/application. Cite relevant literature references. Include discussion of any findings (if available) from relevant pilot or preliminary work or any related work underway. For development of devices and technologies, provide an intellectual property plan as part of the supporting documentation.

Hypothesis: State the hypothesis to be tested and the expected results. For development of devices and technologies, discuss the technical feasibility of the proposed project including background of the problem, previous and current solutions, similar projects previously undertaken, and related development activities.

Technical Objectives: State concisely the question to be answered by each research objective.

Project Milestones: Identify timelines for critical events that must be accomplished in order for the project to be successful in terms of cost, schedule, and performance. For development of devices and technologies, discuss the timelines and provide a commercialization strategy/plan for the technology being developed.

Military Significance: State precisely the estimates as to the immediate and/or long range usefulness of this study to the Armed Forces, as distinguished from general advancement of knowledge in medicine.

Public Purpose: If appropriate, provide a concise, detailed description of how this research project will benefit the general public.

Methods: Give details about the experimental design and methodology. If the methodology is new or unusual, describe it in sufficient detail for evaluation.”

In conclusion, the above is a very abbreviated overview of some of the key points made in the 98-page BAA. Faculty and research offices supporting them who are interested in this program will need to do a deep dive into this BAA to ensure meeting all the details required for a submission. Based on past funding history, a wide range of faculty will possibly have an interest in this program, including those from engineering, medicine, veterinary medicine, biological and chemical sciences, health and kinesiology, social and behavioral sciences, etc.

A final caveat, military websites will sometimes flag your browser that the certificate security protocols are not met, typically stating **“Certificate Error,”** and offer you the choice of continuing on to the site or not going to the site. Keep this in mind if you Google **“United States Army Medical Research and Materiel Command”** for additional information on this program,

Research Development & Grant Writing News

e.g., FAQs and related information funding opportunities. In writing this article, the “Certificate Error” message was ignored.

Post-Shutdown Startup

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By Mike Cronan, co-publisher

[\(Back to Page 1\)](#)

With the Super Bowl over and March Madness over a month away, Las Vegas odds makers are likely overcoming a lull in business by setting a money line for a possible second shutdown. Or they may be adapting a point spread to allow betting on the number of days before a shutdown or the number of days a second shutdown will last. The possibilities are endless, but unlike the upcoming March Madness that is full of inspirational youthful exuberance, there is nothing inspirational whatsoever about the shutdown. In fact, the online Power Thesaurus lists 59 [antonyms](#) for inspirational, most of which accurately characterize the shutdown for those faculty and the research offices assisting them in submitting proposals to federal research agencies.

According to [Science Magazine](#), “(T)he agencies that conduct or fund research that have been mostly closed by the shutdown include NASA, the National Science Foundation (NSF), the U.S. Department of Agriculture, the Food and Drug Administration, the National Oceanic and Atmospheric Administration, and the National Institute of Standards and Technology.”

Of these agencies, NSF is perhaps the most critical to universities because of its \$7.6 billion research budget across seven directorates that provide funding across most university colleges, departments, centers, and institutes. Fortunately, NSF is also a great communicator. This was clear from a January 31 “back in business” [Important Notice No. 145](#) to the Science and Engineering Community on the “Resumption of Operations at the National Science Foundation.”

Unfortunately, this notice includes several caveats (emphasis added): “After a long and difficult lapse in appropriations, the agency is operating under a three-week continuing resolution. This means we will ***not be able to conduct ‘business as usual,’*** and we will have to ***set priorities for what to do first.*** We will ***start with the most pressing of issues,*** including ***processing the backlog of awards to universities and small businesses, rescheduling merit review panels that were cancelled, funding facilities and renewing oversight of those facilities, and funding graduate student and postdoctoral fellowships.*** In addition, we will advance the bold new agenda for science envisioned by NSF and the National Science Board, an agenda now being formulated in new solicitations. Our hardworking staff will be pressed to do more. We once again ask for your forbearance as we deal with this unprecedented situation. And we welcome good ideas for making rapid progress, whether they come through scientific organizations and societies or from individuals.

“Also on January 31, the agency posted the [NSF Grant and Cooperative Agreement-Related Policy and Systems Issues Following the Resumption of Operations at the National Science Foundation](#), **a page that should be bookmarked** since it will continue to be updated as more information becomes available on post-shutdown resumption of operations, or a second shutdown January 16. “It is difficult here not to once again think of the 43rd Speaker of the U.S. House of Representatives Sam Rayburn’s iconic observation, “there is no education in the second kick of the mule.”

Research Development & Grant Writing News

A key notice in the above document is that (emphasis added) “The implementation date for the revised NSF *Proposal and Award Policies and Procedures Guide* (PAPPG) ([NSF 19-1](#)), which was scheduled to become effective on January 28, 2019, **has been delayed**. **NSF will post a new implementation date on the NSF website as soon as practicable**. In the interim, the current version of the PAPPG ([NSF 18-1](#)) applies.” The document also notes that “Guidance to the proposer and awardee community was updated on January 25, 2019, to specify that NSF will be extending the deadline date for the solicitations or Dear Colleague Letters (DCLs) listed in the table [here](#). The table has now been updated to include any additional affected solicitations and DCLs, along with the revised deadlines. **Deadlines for published program descriptions, announcements, solicitations and DCLs that do not appear on the list below remain unchanged.**”

At USDA/NIFA, post-shutdown information came in the form of an [Important Notice to NIFA’s Stakeholder Community](#), specifically noting (emphasis added): “USDA . . . will prioritize items and start with the matters needing the most attention, **including the processing of the backlog of awards and payments, rescheduling canceled peer review panels, processing no-cost extensions and other grant actions, responding to ASAP and other grant and program inquiries, and reopening Requests For Applications (RFAs) that were open during the lapse**. The Enhancing Agricultural Opportunities for Military Veterans Competitive Grants and the Food and Agricultural Sciences National Needs Graduate and Postgraduate Fellowship (NNF) Grants Program RFAs will be reposted and extended for seven business days from the date of re-publication. The Biotechnology Risk Assessment Grants Program (BRAG) **RFA deadline of February 20, 2019, will be extended seven additional business days**. Please sign up for NIFA updates on RFAs at <https://www.nifa.usda.gov> to be notified when these RFA’s are reposted. Additionally, in coordination with Sec. Sonny Perdue and his staff, we’ll start working on implementing the 2018 Farm Bill.”

While all federal agencies have online general documents related to operations in the case of a government shutdown ([Government Reopening Check List - Items for Consideration January 2019](#)), these documents are mostly out of date and therefore unhelpful. Researchers need specific information on the most pressing issues related to funding, review panels, due date extensions, and other information related to this particular shutdown and the process of resuming operations.

In conclusion, the best way to keep updated on agencies’ attempts to resume normal operations after the shutdown is to check their websites daily for newly posted information. Moreover, this is a good time to sign up for an agency’s RSS feeds, email alerts, and other electronic information about agency funding programs. Fortunately, as stated earlier, NSF does a great job of communicating important information to researchers and research offices. In this case, checking daily or more often on the site, [NSF Grant and Cooperative Agreement-Related Policy and Systems Issues Following the Resumption of Operations at the National Science Foundation](#), will keep researchers up to date over the coming month.

How to go from Research Ideas to Research Dollars Ten Key Steps to Getting Your Ideas Funded

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By Mike Cronan, co-publisher

[\(Back to Page 1\)](#)

As the geologists say, “if you don’t ask the right questions the rock won’t answer.” This expression has its analog in the pursuit of research funding. If you don’t ask the right questions about yourself, your potential funder, the funding solicitation, the process of identifying funding opportunities, and the process of planning, developing, writing and submitting a successful proposal, then the funding agency is unlikely to answer your request for funding in a positive way. In order for you to build a successful portfolio of research awards, you will have to satisfactorily answer many of the following questions. ***The questions listed below are essentially the critical touchstones that will transition you from a research idea to a funded research idea.*** You must answer some of these questions about yourself and your research readiness before submitting a successful proposal. Others are questions you must ask about the depth of your understanding of the funding agency, research solicitation, review and selection process, and the grant-writing process itself to determine whether you are prepared to write a competitive proposal.

1. **Know yourself** (as Ann Landers once said “***Know yourself. Do not accept your dog’s admiration as conclusive evidence that you are wonderful.***”)
 - a. What are my research strengths?
 - i. How do I most effectively characterize my research strengths, expertise, experience, background, and future directions?
 1. Can I do this succinctly, clearly, and simply?
 2. Can I explain my research and make a convincing case for the importance of my research to a scientifically literate (intelligent or “informed” reader) reviewer who is a nonexpert in my field?
 - ii. What is the significance of my research expertise to my disciplinary field and can I explain this citing the appropriate literature?
 - iii. How will my research contribute to my disciplinary field or other disciplinary fields and advance them in some important way?
 - iv. Is my research disciplinary, multidisciplinary, interdisciplinary, transdisciplinary?
 1. Do I understand how these terms are used by specific agencies, e.g., by NSF?
 - v. Is my area of expertise addressed in the agency’s strategic plan?
 1. How would my research advance the agency strategic plan?
 - vi. Does my research bring value-added benefits to the agency and program?
 - vii. Does my research advance the mission priorities of the agency?

Research Development & Grant Writing News

1. Do I clearly understand the difference between basic research agencies (e.g., NSF, NIH, DARPA) and mission specific agencies (e.g., DOD, NOAA, DOE) and how different agencies characterize value-added benefits?
- viii. Have I prepared a convincing and brief (perhaps 1 page) white paper that serves as a very concise and clearly stated overview of my research goals, objectives, rationale, experience, and expertise that would be of interest to a potential funder? Also, does this white paper (abstract, project summary, executive summary, “elevator speech,” etc.) make a compelling case for the value-added benefits my research would bring to the critical mission areas of the agency, or to the research field, or to other research fields?
- b. What are my research weaknesses?
 - i. Do I lack preliminary data; if so, how will I address that?
 - ii. Do I lack publications on the research topic; if so, how will I address that?
 1. Do I lack the appropriate peer-reviewed publications that will help convince reviewers of the importance of my research and my capacity to perform?
 2. Are my publications too weighted towards non-peer reviewed proceedings, book chapters, conference presentations, etc. that will leave reviewers unconvinced about the importance of my research and my capacity to perform?
 - iii. Do I lack experience and expertise in the field; if so, how will I address that?
 - iv. Do I need research collaborators; if so, how will I address that?
- c. Do I have a strategic plan for my research?
 - i. Where am I going and how do I plan to get there?
 1. Why is it important that I do this research?
 - ii. How do I best characterize the significance of my current research/expertise
 1. To the field?
 2. To other fields?
 3. To the agency?
 4. To an agency mission?
 - iii. Where will my research be in five years, or even ten or twenty years?
 - iv. Does my research require my engagement in “team science” and research collaborations?
- d. Can I define my disciplinary domain of interest (e.g., education, engineering, science, social science, humanities, education, health and biomedical sciences, etc.) with sufficient clarity to begin the process of identifying potential funders of my research?
- e. Can I clearly characterize the nature of my research interests within my disciplinary domain, e.g., is my research predominantly basic or applied, or perhaps applications or contract based?
- f. Have I identified funding agencies whose mission, strategic plan, and investment priorities are aligned with my research interests and expertise;

Research Development & Grant Writing News

- g. If required, do I know how to develop the research and/or educational partnerships and research collaborations with other researchers in other disciplines or at other institutions needed to be competitive at a specific agency or for a specific program area?
- h. Have I gone through the process to further align my research interests with funding agency opportunities by:
 - i. Reviewing past funding solicitations by the agency,
 - ii. Reviewing abstracts of recently funded proposals by the agency in my disciplinary area
 - 1. Reviewing abstracts (aka project summary or executive summary) of recently funded projects gives researchers yet another source of information about the interests of a funding agency by presenting review panels' and program officers' selections of successful proposals. Reading the abstracts of funded projects will give you a more nuanced understanding of the funding agency culture and expectations specific to a solicitation, or cluster of solicitations, within a disciplinary domain. Abstracts from the two most current past funding cycles are typically the most informative because annual grant solicitations often evolve over time. Most agencies post the abstracts of funded projects on their websites.
 - 2. Reviewing agency mission statements. Many avenues lead to gaining a more substantive and nuanced understanding of the mission and culture of the funding agency, including:
 - a. Visiting the agency website and reviewing the mission, strategic plans, and research and educational roadmaps of both the agency and the programmatic areas within the agency;
 - b. Reviewing online postings of agency reports, presentations, and research and/or educational workshops given by agency program officers;
 - c. Talking to colleagues that have been funded by the agency;
 - d. Identifying researchers on your campus that have served as agency program officers (e.g., NSF rotators) and talking to them;
 - e. Identifying researchers on your campus that have served as reviewers for specific agencies and programs and talking to them;
 - f. Reading agency online abstracts of currently funded projects and asking (by email or phone) whether the PI is willing to talk to you about the agency;
 - g. Reading current agency solicitations in your disciplinary area and identifying any reports, presentations, or technical workshops identified in the solicitation as motivating the agency's funding of particular research areas;

Research Development & Grant Writing News

- h. Subscribing to agency RSS feeds and email alerts that keep you current on new solicitations, reports, presentations, technical workshops, and general agency news related to mission and research priorities.
 - 3. Analyzing the funding agency will help you better understand several key elements common to every competitive proposal narrative:
 - a. Who is the audience (e.g., agency program officers and reviewers) and how are they best characterized in terms of the expertise they bring to the review process?
 - b. What is the best way to address them?
 - c. What is a fundable idea, and how does it support the agency's research investment priorities, or mission-critical objectives?
 - d. How are claims of research uniqueness and innovation best supported in the proposal text and how well do they agree with the agency's research objectives, or mission focus?
 - e. How do you best communicate your passion, excitement, commitment, and capacity to perform the proposed research to review panels and program officers using the language of the funding agency?
 - iii. Reviewing the agency strategic investment plans, research roadmaps, and related documentation,
 - iv. Exploring the agency website,
 - v. Reviewing agency workshops on funding, e.g., NSF regional grants conferences, or agency webinars specific to a particular solicitation or general webinars on writing proposals to that agency, e.g., DoED/IES,
 - vi. Reading the agency guidelines on submitting proposals to the agency,
 - vii. Reading agency guidelines on submitting unsolicited proposals to the agency, e.g., Department of Energy Guide to Submitting Unsolicited Proposals.

2. Know your funder

- a. What kinds of research does the agency fund?
- b. What is the agency mission(s)?
- c. What is the agency culture?
- d. What is the agency trying to accomplish with this specific program solicitation, or suite of related program solicitations?
- e. How are proposals reviewed at the agency?
- f. Who makes the funding decisions?
- g. What is the role of the program officer in funding decisions?
- h. Talk to the program officer(s), but keep these questions in mind:
 - i. Do I have specific, well thought out questions I want answered?
 - ii. Have I read and reread the solicitation?
 - iii. Have I informed myself about the agency's mission and culture?
 - iv. Have I informed myself on the mission and culture of the program area?
 - v. Have I carefully read information posted to the agency website?

Research Development & Grant Writing News

- vi. Do I have an idea whose fittedness I want to discuss with the agency?
- vii. Do I understand I will not be asking about the likelihood of being funded?
- viii. Do I understand the call will not be a meandering fishing expedition?
- ix. Do I understand I will not be asking questions that are easily answerable by a close reading of the solicitation or documents referenced in the solicitation?
- i. Never be hesitate to contact a program officer for clarification—any ambiguities in your understanding of the agency mission priorities or in the funding solicitation need to be resolved; otherwise, it will be impossible to write a successful proposal.
 - i. Timidity is NEVER rewarded in the competitive proposal process!
 - ii. Ambiguities are ALWAYS punished!

3. Identify a funding solicitation

- a. Develop search protocols to fit your research interests
- b. Know relevant agencies likely to fund your research
- c. Learn the agency's grant cycles
- d. Use agency email alerts and RSS feeds to keep you informed of upcoming funding opportunities and relevant reports, workshops, webinars, etc. that can help you write a more competitive proposal
- e. Know the process for unsolicited proposals
 - i. Proposals may be initiated in two general ways by the university researcher:
 - 1. in response to a published solicitation (solicited proposal, RFP, BAA, PA); or
 - 2. by the investigator (unsolicited proposals and white papers).
 - a. ~50% of NSF and ~80% of NIH proposals are unsolicited—learn the process specific to agency
- f. Review open BAAs (Broad Agency Announcements) for program funding opportunities and the process of submitting proposals, included such “multigate” quad charts, white papers, preliminary or preapplication proposals.
 - i. BAAs are commonly used by mission agencies (e.g., DOD, DOE, NOAA). They remain open for some period of time, typically least a year but often longer. The BAA lists the mission priority research areas of interest to the agency along with all information needed to submit a proposal in response to the BAA.
- g. Consider transagency research funding opportunities
 - i. Transagency funding opportunities represent solicitations published jointly by two or more federal research agencies. For example, NSF has published joint solicitations with such agencies as USDA, DOE, DOD, among others, to address key research areas that are interdisciplinary and are common to the core mission of the partnered agencies. For example, NSF and USDA have partnered on the research topic related to water sustainability and climate.
- h. Keep in mind that a funding solicitation is an invitation by a funding agency to submit a proposal focused on addressing **research topic areas of interest to the agency**, i.e., your proposal must map tightly to agency mission and bring value-added benefits to that mission. **Bottom line:** it is your task to fit and be fully

Research Development & Grant Writing News

responsive to the research interests of the funding agency; it is not the task of the research agency to be responsive to your research interests. Moreover, keep in mind that:

- i. The solicitation is a non-negotiable listing of performance expectations reflecting the mission goals and research objectives of the funding agency.
- ii. The solicitation is not a menu or smorgasbord offering you a choice of addressing some research topics but not others, depending on your interest, or some review criteria, but not others.
- iii. The solicitation contains or references all the key information you will need to develop and write a competitive proposal that is fully responsive to an agency's mission, for example, the agency's:
 1. submission process,
 2. research objectives,
 3. review criteria, and
 4. budget requirements.
- iv. Review referenced documents in the funding solicitation, for example:
 1. Understand funding opportunities at all scales: RFP, Program, Division, Agency, Field, National, etc.
 - a. The solicitation resides at the fine grain scale, but it also resides in a larger context, or scale, of how the agency defines its mission at the larger scales, e.g., the agency strategic plan or research roadmap, as well as at the national level, e.g., perhaps a solicitation starts with a workshop or report from the National Academies on some "grand challenge" research topic and, therefore, your success in writing a proposal to a specific solicitation can be significantly influenced by how well you understand the agency's motives for investing in the specific research topic.
 2. Reports, workshops, conferences, webinars, etc.
 - a. This is a key point to keep in mind because successful grants are those that gain a marginal advantage over the competition. You are always competing at the margins or boundaries of excellence, and to do that well means that every opportunity you have to write a better proposal needs to be fully exploited. Viewing a webinar or reading a report that gives you a deeper and more nuanced understanding of the funding agency's reasons for supporting a program will provide critical information when crafting the arguments you will put forward to convince program officers and reviewers to fund your proposal.
 3. Agency mission, culture, investment priorities, strategic plan, etc.
 - a. Agency websites are now very robust and information rich in terms of helping you better understand the mission interest of the agency.

Research Development & Grant Writing News

- v. Understand the agency language used in solicitation, for example:
 - 1. Team science (aka partners, collaborators...)
 - a. Complexity of the scientific problem
 - b. Disciplines required to solve the problem
 - c. Value-added benefits
 - d. Integration and synergy
 - e. Technology development
 - f. Innovation ecosystems (e.g., NSF)
 - g. Commercialization partnerships
 - 2. Value added benefits
 - 3. Interdisciplinarity
 - 4. Transformational research
 - a. NSF, for example, uses this term to describe a range of endeavors that promise extraordinary outcomes, such as revolutionizing entire disciplines, creating entirely new fields, or disrupting accepted theories and perspectives.
 - 5. Synergy not silos
 - 6. Societal Goals
 - 7. Broader impacts
- i. Solicited
- j. Unsolicited (investigator initiated)
- k. Identify your research and education interests and goals
- l. Learn about the types of grants and agencies that fund research in your area
- m. Understand interdisciplinarity and team grants
- n. Learn how to find funding opportunities that fit your goals and interests
- o. Learn how various agencies fund research and education projects, both solicited and unsolicited
- p. Understand the agency's investment priorities/mission
- q. Learn role of BAAs (Broad Agency Announcements) in Your Funding Strategies
 - i. They describe the agency's research interest, either for an individual program requirement or for broadly defined areas of interest covering the full range of the agency's requirements;
 - ii. Describe the application and submission process, particularly any requirements for approval waypoints, such as quadcharts, white papers, preliminary proposals, and preapplications required to be invited to submit a full proposal;
 - iii. Describe the criteria for selecting the proposals, their relative importance, and the method of evaluation;
 - iv. Specify the period of time during which proposals submitted in response to the BAA will be accepted;
 - v. Designate a Point of Contact (POC) specific to agency research topic areas. BAAs typically encourage potential applicants to contact the agency POC to discuss the relevance of their research to the agency mission priorities before preparing proposals

Research Development & Grant Writing News

- r. Develop a long-term strategy for funding your research

4. Map your research to agency opportunity

- a. Make sure your research fits the research interests of the funding agency, either as defined in a specific solicitation or by fitting a list of agency research priority research topics, for example, as listed in an agency BAA.
- b. Talk to a program officer about your research and how well your research fits the interests of the agency.
- c. Talk to colleagues who have been well funded by the agency, served as reviewers for the agency, or have served as rotating program officers at the agency to gain an additional insight into how well your research and your “research readiness” maps to mission of the funding agency.

5. Analyze the solicitation

- a. Does my research expertise fit the goals and objectives of a specific solicitation?
 - i. How well do I understand the agency goals and objectives in the solicitation?
 - ii. Can I address all the research goals and objectives required by the solicitation?
 - 1. Do I need research collaborators for a competitive submission?
 - iii. Am I understanding the solicitation for what it is--**not what I want it to be**?
 - iv. Is there sufficient time to plan, develop, and write a competitive proposal?
- b. Can I make a compelling case for the significance of my research to the solicitation?
 - i. Why is my research significant?
 - 1. Why should an agency want to fund my research?
 - a. Can I explain why my research is exciting and novel?
 - ii. What are my research objectives?
 - 1. Is my research hypothesis-driven?
 - a. If so, can I state the hypothesis clearly?
 - 2. How will my research lead to new knowledge?
 - a. Will my research advance the field in some important way?
 - 3. Is my proposed research based on prior research support?
 - a. What were the outcomes of my past funded research?
 - 4. Do I have preliminary data that bolsters my case for funding?
 - a. Do I have sufficient preliminary data to be competitive?
 - iii. Do I have a realistic research plan?
 - 1. Can I make clear what I propose to do?
 - 2. Can I make clear why I propose to do it?
 - 3. Can I make clear why it is important to do it?
 - 4. Can I make clear that I have the expertise to do it?
 - 5. Can I demonstrate that my research plan is believable and not overly ambitious?
 - 6. Can I present a research plan based on a stepwise, logical approach?
 - 7. Can I instill in reviewers a confidence in my capacity to perform?
 - iv. Is my research basic or applied?

Research Development & Grant Writing News

1. Do I know the difference between basic and applied research?
2. Is the agency a basic research agency or a mission agency?
3. Do I know the difference between a basic and a mission agency?
4. Do I know how this distinction is made at the agency of interest?
 - a. Does the agency fund both basic and applied research?
 - b. Do I know what program offices at a specific agency fund basic research and which fund applied research?
- v. Am I considering the appropriate agency program for my research?
 1. Is there more than one agency program for which my research is fitted?
 2. Does the agency accept unsolicited proposals?
 - a. Do I know the process for submitting an unsolicited proposal?
 3. Have I had sufficient discussions with a program officer to ensure there are no unanswered questions I have about the agency that are key to my competitiveness, and that I have resolved any ambiguities in my understanding of the research funding solicitation, or agency priority areas if I am submitting an unsolicited proposal?

6. Develop a proposal production schedule

- a. The end point of the proposal production schedule is the proposal due date and the beginning point is the date you decide you will submit a proposal—these two points bracket your production activities, including scheduling:
 - i. Multiple draft iterations of the research narrative (project description)
 1. If there are multiple authors then draft sections need to be assigned to team members for completion
 - ii. Drafting the proposal budget, writing the budget justification, and preparing or managing the collection of related documents, commitments, and other proposal components not part of the research narrative, e.g., cost sharing commitments, current and pending support, biographical sketches, data management plans, post-doc mentoring plans, letters of support, etc.
 - iii. Task and performance assignments for all team members
 1. Good proposal team members do what they say they will do when they say they will do it and provide material of sufficient quality to enhance the competitiveness of the overall effort.
- b. A poorly planned proposal has little likelihood of success. Walt Kelly's Pogo once famously observed, "***We have met the enemy and he is us!***" That observation perfectly fits a poorly planned proposal development effort.
- c. A well-planned proposal development effort cannot turn ideas of modest importance into ideas of compelling significance, but it can give your ideas a chance to be realized through a well-crafted proposal rather than disguised by a poorly crafted one.

7. Use the solicitation as a draft proposal template

Research Development & Grant Writing News

- a. Copy and paste the solicitation's key sections, research objectives, and review criteria into a beginning draft narrative as an organizational template for the full proposal. This ensures that subsequent draft iterations of the research narrative are continuously calibrated to the guidelines and fully responsive to all of the sponsor's requirements:
 - i. fully responds to all requested information,
 - ii. offers information in the order requested,
 - iii. provides the required level of detail,
 - iv. integrates review criteria into the narrative, and
 - v. makes a complete and compelling case for the significance of your research, i.e., why it has valued-added impact on the agency's mission.
- b. Do I understand how the agency will review my proposal?
 - i. Do I understand the overarching review criteria used by the agency?
 1. Do I understand how basic research agencies review proposals?
 2. Do I understand how mission agencies review proposals?
 - a. Do I understand the role of mission-critical priorities in the review process?
 - ii. Do I understand the program or solicitation's specific review criteria?
 - iii. Do I understand the role of the program officer in the review process?
 1. Are reviews binding on the program officer?
 2. Can the program officer consider some reviews advisory only?
 - iv. Will my proposal be peer reviewed and by what format?
 1. Will there be a panel review?
 2. Will there be a mail review?
 3. Will some other process be used?
 - v. Specific review criteria and review processes differ from agency to agency, as well as by program within an agency, or by type of solicitation. **But the core, generic questions program officers and reviewers want answered can be simply stated:**
 1. What do you propose to do?
 2. Why is it important—what is its significance?
 3. Why are you able to do it?
 4. How will you do it?
 5. How does it contribute to and advance the research interests of the agency or the field?
 - vi. Do I understand "**how to write for reviewers**" and program officers?
 1. Unless you are confident you know otherwise, when writing to reviewers, **write for the intelligent reader and not the expert**. Remember you are most likely writing to a panel of reviewers, each member of which will be selected for a needed expertise. In all cases:
 - a. You must craft a persuasive argument presenting the merit, significance, rigor, and relevance of your research that makes the reviewers want to fund it;

Research Development & Grant Writing News

- b. You must convince reviewers you have the capacity to perform, and the institutional infrastructure to support your research;
 - c. You must extend your argument to discuss the likely impact your research will have in advancing the field and creating new knowledge, both in your research area and possibly in other research fields as well; and
 - d. When writing to federal mission agencies, you must demonstrate to the program managers and reviewers that your research advances the mission of the agency.
2. The author of a funded proposal has accomplished the following basic goals of writing for or with reviewers in mind:
 - a. Ensured the reviewers were intrigued and excited about the proposed research;
 - b. Understood its significance to the agency mission or field;
 - c. Understood that existing research enhances the likely success of the proposed effort;
 - d. Understood how the proposed research will be accomplished;
 - e. Had confidence in the researcher's capacity to perform.
3. Writing for Reviewers—**Generic Narrative Tips**
 - a. Sell your proposal to a good researcher but not an expert;
 - b. Some review panels may not have an expert in your field, or panels may be blended for multidisciplinary initiatives, so write to all the reviewers on the panel;
 - c. Recall that proposals are not journal articles; proposals must be user friendly and offer a narrative that is compelling and memorable to reviewers;
 - d. Proposals are not mystery novels. Reveal the significance of your research early, not at the conclusion;
 - e. Reviewers will assume that sloppy errors in language, usage, grammar, and logic will translate into sloppy errors in your research;
 - f. Write a compelling project summary (or abstract) and narrative introduction:
 - i. This is where you must capture the interest of reviewers and win them over by making them intrigued enough to want to read your entire proposal closely and with interest;
 - ii. Define the significance of the core ideas early, clearly, and concisely;
 - iii. Describe the connectedness of the core ideas to specific research activities and outcomes, and advance your ideas with sufficient detail to make your research memorable after the proposal is read.

Research Development & Grant Writing News

8. Draft the project description

- a. Use the solicitation as a template to draft the project narrative;
- b. Make sure all members of the research team have read and understand the expectations of the solicitation;
- c. Answer in narrative form all the questions asked in the solicitation in the order they are asked;
- d. Plan on the use of graphics, visuals and milestone charts to complement the narrative text
 - i. Narrative text is linear. It is grounded on a logical sequence of explanation made coherent and persuasive by the author's writing skills. Graphics, however, function as a "**visual language**" able to capture complex relationships in a simple and unifying way by synthesis, integration, and synergy, the holy grail of the successful narrative.
- e. The generic underpinnings of a successful research grant include five key persuasive elements: **the research vision, goals, objectives, rationale, and specific outcomes**. These five key components are strengthened by preliminary data, results from prior research support, publications in the field, and patents, among other prior performance information that validates your capacity to perform. Depending on the solicitation, these elements may or may not appear in the order described here, but they typically provide the critical mass of the persuasive argument in successful proposals. They also provide clarity through a logically-tiered framework that allows reviewers to differentiate your research at multiple levels of specificity and detail, from the macro-vision to micro-performance details.
- f. Recognize what a successful research narrative **is not**.
 - i. A research plan cloaked in a fog of poorly written text.
 - ii. A vague research vision lacking focus, or reading, as H.L. Menken once observed, "*like an army of words marching across the page in search of an idea.*"
 - iii. A research narrative focusing heavily on general statements about past and planned research, but failing to give details and specifics that help readers understand the importance of the research, or its significance in advancing the field through questions, hypotheses, or solutions.
- g. Recognize what a successful research narrative **is**.
 - i. Starts with an important research idea stated clearly and simply so reviewers can quickly grasp the research questions or hypotheses.
 - ii. Explains why your research is unique and supports this with sufficient specificity and detail to make your case.
 - iii. Explains the importance, significance, or value-added benefits of your research to advancing the field, or advancing the research mission of the funding agency.
 - iv. Provides reviewers with a clear statement of the significance of the project from a precisely written project description that is supported by specificity and detail.

1. Specificity grounds the research vision and goals in the key performance details unique to your research objectives, and thereby illuminates the importance of your research for reviewers.
 2. Specifics serve to both test and prove the value of your ideas, and when they are lacking, it tells a reviewer that your ideas may also be lacking, or have yet to become fully developed.
 3. Stating a goal without then offering compelling specifics that make clear the process you will use to transition a goal to reality, i.e., a research outcome, is the domain of politicians and bumper sticker slogans and not that of the successful research proposal.
- v. Conversely, generalities seem to escape many authors' notice, yet appear as glaring flaws to readers and reviewers alike, especially those searching for the specificity needed to make an informed critical judgment on the project's merit. The experience of reading a narrative laced with generalities leaves the reader and reviewer alike with a foreboding and increasingly exasperating sense of uncertainty about specifically what the proposer actually plans to do.
- vi. Moreover, ambiguity introduces significant uncertainty into the research narrative, although ambiguity in the narrative does offer one certainty—an unfunded proposal. ***This is because ambiguity in the project description imposes unwanted riddles on program officers and reviewers alike*** that may lead them to believe reading the research narrative is an experience somewhat akin to attempting to interview Schrödinger's Cat without opening the box to determine its state, either dead or alive. However, narrative ambiguity exists in only one state—confusion.

9. Ask colleagues to critique your drafts

- a. Too often, the first – and final – substantive outside review of a proposal narrative occurs when the funding agency makes the funding decision. ***This is too late in the process to ensure success!***
- b. Ask colleagues to review your proposal prior to submission and with sufficient time remaining for you to make narrative changes. Let them know upfront that you want the ***“brutal, frank and honest”*** review option and not the ***“nice and sensitive to your feelings”*** review option. Ask them to:
 - i. Find weaknesses, deficiencies, and ambiguities in the proposal text;
 - ii. Identify inconsistencies and omissions between the proposal narrative and the requirements of the solicitation and review criteria;
 - iii. Play the devil's advocate when necessary;
 - iv. Challenge the vision, assumptions, and other statements in the text that are not well supported or clearly stated, or are poorly argued;
 - v. Make observations on the persuasiveness of the arguments you put forward describing the uniqueness of your research;
 - vi. Offer suggestions that both correct identified deficiencies in your research narrative and better amplify identified strengths.

Research Development & Grant Writing News

10. Converge on narrative perfection

- a. The key to a successful proposal represents the outcome of a process of continuous iteration and improvement of the project narrative that, over a sufficient amount of time, *converges on perfection*.

Research Grant Writing Web Resources

([Back to Page 1](#))

[What Does NIH Look For?](#)

“The NIH provides financial support in the form of [grants](#), [cooperative agreements](#), and [contracts](#) . This assistance supports the advancement of the [NIH mission](#)  of enhancing health, extending healthy life, and reducing the burdens of illness and disability. While NIH awards many grants specifically for research, we also provide grant opportunities that support research-related activities, including: fellowship and training, career development, scientific conferences, resource and construction. Learn more about the [types of programs](#) NIH supports. We encourage:

- **Projects of High Scientific Caliber**

NIH looks for grant proposals of high scientific caliber that are relevant to public health needs and are within [NIH Institute and Center](#)  (IC) priorities. ICs highlight their research priorities on their individual [websites](#) . Applicants are urged to contact the [appropriate scientific program staff](#) at the Institute or Center to discuss the relevancy and/or focus of their proposed research before submitting an application.

- **NIH-Requested Research**

NIH Institutes and Centers regularly identify specific research areas and program priorities to carry out their scientific missions. To encourage and stimulate research and the submission of research applications in these areas, many ICs will issue [funding opportunity announcements \(FOAs\)](#) in the form of [program announcements \(PAs\)](#) and [requests for applications \(RFAs\)](#). These FOAs may be issued to support research in an understudied area of science, to take advantage of current scientific opportunities, to address a high scientific program priority, or to meet additional needs in research training and infrastructure. To find an FOA in your scientific field, search the [NIH Guide for Grants and Contracts](#) which includes all funding opportunities offered by NIH, or [Grants.gov](#)  to search across all Federal agencies.

- **Unsolicited Research**

NIH supports “unsolicited” research and training applications that do not fall within the scope of NIH-requested targeted announcements. These applications originate from your research idea or training need, yet also address the scientific mission of the NIH and one or more of its ICs. These “unsolicited” applications should be submitted through “[parent announcements \(PAs\)](#)”, which are funding opportunity announcements that span the breadth of the NIH mission.

- **Unique Research Projects**

Projects must be unique. By law, NIH cannot support a project already funded or pay for research that has already been done. Although you may not send the same application to more than one [Public Health Service \(PHS\)](#) agency at the same time, you can apply to an organization outside the PHS with the same application. If the project gets funded by another organization, however, it cannot be funded by NIH as well.”

Research Development & Grant Writing News

Understanding NIH: Finding the Right Fit for Your Research

“As you begin your journey in search of NIH grant funding, the information in this section can help you understand the structure of NIH and why it is important to successfully navigate the grants process.

Where’s the Money?

NIH is made up of [27 institutes and centers](#) (often referred to as ICs), 24 of which can make grant awards. Our ICs award more than 80% of the NIH budget each year to support investigators at more than 2,500 universities, medical schools, and other research organizations around the world. About 10% of the NIH’s budget supports scientists in our own laboratories here at NIH, most of which are on our campus in Bethesda, Maryland.

Each IC has a [separate appropriation](#) from Congress, and the director of each IC decides which grants it will fund, taking into consideration input from their staff, the results of the scientific peer review of the grant application, public health need, scientific opportunity, and the need to balance its scientific portfolio. NIH only funds research that has been judged highly meritorious in the [peer review process](#).

Institute and Center Missions and Priorities

Each IC has a distinct mission that focuses on a specific disease area, organ system, or stage of life. The mission and priorities of each IC are stated on their individual [websites](#). Prospective grantees should do their research to identify the ICs that might be interested in their research idea. Many research topics may be of interest to multiple ICs, so [make contact with different scientific program officials](#) around NIH. They can help you determine the best IC home for your idea.

Another way to determine which IC may be interested in your idea is to use our Matchmaker tool in [RePORTER](#) (see our [video demonstration of Matchmaker](#)). Your query result may also be useful for finding NIH program official contacts at NIH. Click on the details tab for individual grants in the search result to find the program official responsible for that area of research.

Why is it so important to identify an IC that may be interested in your work? As you start [looking for funding opportunities](#), ensure that the IC potentially interested in your area of science is listed as a participating organization on the funding opportunity announcement that you use to submit your application. If they are not listed as participating on the funding opportunity announcement you use to submit your application, they will not be able to consider your application for funding. “

Types of Grant Programs

“This page will help you explore the types of grant funding NIH offers, from research grants to career development awards, research training and fellowships, center grants, and more. NIH uses activity codes (e.g. R01, R21, etc.) to differentiate the wide variety of programs we support. NIH Institutes and Centers may vary in the way they use activity codes; not all ICs accept applications for all types of grant programs or they apply specialized eligibility criteria. Look closely at the FOA to determine which Institutes and Centers participate and the specifics of eligibility. [Learn more](#). “

Research Development & Grant Writing News

Types of Grant Applications

Learn about the various types of grant applications (new, renewal, revision, resubmission) as well as any specific specific submission requirements for each. [Learn more](#).

Research Development & Grant Writing News

Educational Grant Writing Web Resources

[\(Back to Page 1\)](#)

The American Evaluation Association is now accepting proposal submissions for [Evaluation 2019](#). AEA's annual conference, with the 2019 theme [Paths to the Future of Evaluation](#), is November 13-16, 2019 in Minneapolis, Minnesota.

[Request for Proposals: SBIR Phase I](#)

[A Look at Barriers to Parent-School Involvement for Early Elementary Students](#)

[ERIC in 2018: Bringing Education Research to Users, Wherever They Search](#)

[IES Awards \\$25 Million to Establish Three R&D Centers](#)

[Dual Enrollment: Participation and Characteristics](#)

[A Framework for K-12 Science Education](#)

[Practices, Crosscutting Concepts, and Core Ideas \(2012\)](#)

[Undergraduate Field Experiences Research Network \(U-FERN\)](#)

Field stations and marine labs often provide specific types of training not available elsewhere in the undergraduate education system. These programs have the potential to reach a broad range of undergraduates across the U.S. and the world, and a tremendous investment is made in these programs each year. For these reasons, it is critical to consider how to best provide effective educational experiences at these venues and in other extended field programs. The Undergraduate Field Experiences in Research Network (U-FERN) seeks to understand the impacts of these types of experiences and to build a community of practitioners working together with education researchers to share and develop effective practices that are inclusive of all students. The network will connect current knowledge about the persistence of underrepresented students in Science, Technology, Engineering, and Math (STEM) with practitioners of undergraduate field experiences to harness the power of active learning as a potential for increasing participation and persistence in the field-based sciences.

The Undergraduate-Field Experiences Research Network (U-FERN) seeks to build a vibrant, supportive, and sustainable collaborative network that fosters effective undergraduate field experiences by working toward the following four objectives:

- 1) Identify and share **evidence-based models and practices** for engaging a diverse range of undergraduates in effective field and marine learning experiences.
- 2) Identify, modify, develop, and share **assessment tools** for understanding the impact of field and marine learning experiences on undergraduate student learning, STEM identity, and career trajectories.
- 3) Investigate how undergraduate field experiences **can be more inclusive and attract and serve students** from different ethnic and racial groups and with physical disabilities who are

Research Development & Grant Writing News

currently underrepresented in field-based sciences such as marine science, ecology and geosciences.

4) Harness the power of a network of programs that provide undergraduate learning experiences to **do research on student learning** and contribute our findings to the broader body of evidence about undergraduate STEM learning.

U-FERN will build a new research network that includes researchers in the social and learning sciences, practitioners leading undergraduate field experiences in a range of disciplines, and scholars who are working to broaden participation in STEM through collaborative projects that are supported by network meetings, interdisciplinary working groups, workshops at national-level conferences and meetings, and virtual collaboration tools.

Agency Research News

([Back to Page 1](#))

The National Academies' [Climate Communications Initiative](#) has released a [new strategic plan](#) that will guide its efforts going forward. The initiative was established to enable the Academies' extensive work on climate science, impacts, and response options to inform decision-makers and the public more effectively.

[Dear Colleague Letter Supporting the Re-Entry of Women and Women Veterans in the STEM Workforce through NSF INCLUDES](#)

NSF will consider supplemental funding requests for traineeships and conference proposals that support efforts aimed at enhancing the science, technology, engineering or mathematics (STEM) knowledge base, skillset, leadership and management capacities, and/or contributions to the STEM enterprise of women following a career break. Women veterans' entry or re-entry into the STEM workforce is of particular interest. NSF invites submission of supplemental funding requests to current [NSF INCLUDES](#) awards or other NSF-funded awards in the programs described below to support traineeships for undergraduate and graduate students after a career break. Supplements to support traineeships for women who are veterans and women who have interrupted their studies at the undergraduate level and want to enter or re-enter a STEM career are especially encouraged. Conference proposals should address research to enhance understanding of the process of entry and re-entry in STEM after a career break (e.g., factors associated with access, retention and inclusion) as well as related barriers and opportunities women face entering and re-entering the STEM workforce, especially in the technical fields.

To address the underrepresentation of women in STEM technical fields, traineeships in the applied sciences, skilled trades, and modern technologies are of particular interest. Applicable fields might include but are not limited to, advanced manufacturing, agriculture, computer and information science, energy, engineering, geospatial sciences, micro- and nano-technology, and safety and security. This DCL will not support traineeships for individuals who wish to pursue careers as health, veterinary, or medical technicians.

Collaborations with professional societies, national laboratories, field stations, NSF-funded centers, informal science centers and organizations, government agencies, and non-governmental organizations and academic partners (especially community and technical colleges and minority-serving institutions) are encouraged.

The overarching goal of NSF INCLUDES is to achieve significant impact at scale in transforming STEM education and workforce development by educating a diverse, STEM-capable workforce that includes talented individuals from all sectors of the Nation's population. This DCL seeks innovative approaches to better understand women's engagement in STEM by focusing on women's experience with re-entry to the STEM workforce. This DCL leverages the NSF INCLUDES National Network to expand the ranks of women in STEM, as well as research capacity and understanding of women's re-entry into the STEM workforce.

Research Development & Grant Writing News

DOE Announces Notice of Intent to Issue a Funding Opportunity Establishing a Cybersecurity Institute for Energy Efficient Manufacturing

The U.S. Department of Energy's (DOE's) Office of Energy Efficiency and Renewable Energy (EERE) announced their intent to issue a Funding Opportunity Announcement (FOA) entitled "Clean Energy Manufacturing Innovation Institute: Cybersecurity in Energy Efficient Manufacturing."

This FOA establishes a new Clean Energy Manufacturing Innovation Institute (referred to as the "Institute") to develop technologies that will advance U.S. manufacturing competitiveness, energy efficiency, and innovation. This Institute, the sixth one established by the Department of Energy, focuses on Cybersecurity in Manufacturing – understanding the evolving cybersecurity threats to greater energy efficiency in manufacturing industries, developing new cybersecurity technologies and methods, and sharing information and expertise to the broader community of U.S. manufacturers.

"As the sector-specific agency for cybersecurity in the energy sector, it is our job to make sure energy technologies across the board are best prepared against cyber threats," said Under Secretary for Energy Mark W. Menezes. "Today's announcement highlights the increasing importance cybersecurity plays in energy efficient manufacturing, and this Institute will develop and leverage innovative solutions to current and future challenges."

"The manufacturing sector can further improve its energy efficiency with new sensor and control technologies, but these technologies present cyber vulnerabilities that must be addressed," said Assistant Secretary for EERE Daniel Simmons. "This Clean Energy Manufacturing Innovation Institute will enhance the cybersecurity of energy-efficient manufacturing processes, accelerating the adoption of these technologies in the marketplace." EERE's Advanced Manufacturing Office will oversee this FOA. It is anticipated it may include two technical areas of interest: Securing Automation and Securing the Supply Chain. EERE plans to issue the FOA via the [EERE Exchange](#) in the second quarter of Fiscal Year 2019. The full Notice of Intent can be viewed [HERE](#).

Department of Energy to Provide \$30 Million for New Data Science Approaches for Chemistry and Materials Research

The U.S. Department of Energy (DOE) announced plans to provide \$30 million for new research using modern data science approaches to accelerate discovery in chemistry and materials sciences. "Data science tools such as artificial intelligence and machine learning are poised to profoundly change how scientific research is conducted," said DOE Under Secretary for Science Paul Dabbar. "This initiative ensures that America will remain on the cutting edge of breakthroughs in chemical and materials sciences critical for the nation's energy and economic security." Data science combines computer science, applied math, and statistics with specific fields of science to discover new knowledge from complex data sets.

The initiative seeks proposals that focus on innovative applications of modern data science approaches to understand processes and mechanisms in complex energy-relevant chemical and materials systems. National laboratories, universities, nonprofits, and companies will be eligible to apply for the three-year awards, which will be selected on the basis of peer review. The Basic Energy Sciences program in the Department's Office of Science, which is funding the effort, envisions awards for single investigators and small groups.

Research Development & Grant Writing News

Pre-applications will be due on March 8, 2019 at 5:00 PM Eastern Time, while the deadline for final applications will be May 15, 2019 at 5:00 PM Eastern Time. The Funding Opportunity Announcement for universities, nonprofits, and companies, along with a parallel, companion announcement for DOE laboratories, can be found here. Planned funding for Fiscal Year 2019 will be \$10 million, with outyear funding contingent on congressional appropriations.

[Sloan Foundation call for letters of inquiry: sensor technologies to monitor energy or environmental systems](#)

The Alfred P. Sloan Foundation has established a new, dedicated component within its Energy and Environment program focused on supporting energy and environmental science. ***The Foundation is currently soliciting Letters of Inquiry for innovative, collaborative academic research projects led by early- and mid-career scholars that use sensor technologies to monitor and analyze energy or environmental systems at a granular level in the United States.*** This is one of two open Calls for Letters of Inquiry announced by the Foundation's Energy and Environment program., with the other Call focused on researching net-zero interventions and negative emissions technologies, available at sloan.org/NETZERO-LOI. Grants between \$1-1.5 million for collaborative science and engineering research projects led by early- and mid-career scholars to use sensor technologies to study energy or environmental systems in the United States. **Due April 1.**

[Dear Colleague Letter: Division of Chemistry \(CHE\) International Supplements 2019](#)

The [National Science Foundation \(NSF\) Strategic Plan "Building the Future: Investing in Discovery and Innovation" \(2018 - 2022\)](#) states, "NSF must continue to invest in a world-class research enterprise, support the development of a globally competitive scientific and engineering workforce, and foster greater understanding of science and technology among the American public" and "NSF will promote a research culture that is broadly inclusive in its demography and range of intellectual ideas, has access to cutting-edge infrastructure, and is globally engaged, with increased opportunities for exchanging ideas and collaborating on an international scale. NSF will increase opportunities for broadening the training of U.S. graduate students and early-career researchers through international exchanges and partnerships with industry." NSF's Division of Chemistry seeks to fulfill this vision by advancing research and education in chemistry and ensuring that the U.S. research community remains at the forefront of the field by providing access to the knowledge and resources that exist globally. In this context, the Division of Chemistry is inviting requests for supplemental funding from its existing awardees who may wish to add a new, or strengthen an existing, international dimension of their award when such collaboration advances the field of chemistry and enhances the U.S. investigator's own research and/or education objectives. **Principal Investigators supported by NSF Division of Chemistry awards are advised to consult with their cognizant NSF program director prior to submitting a supplemental funding request.** Supplemental funding requests must be received by 5 p.m., submitter's local time on May 1, 2019.

[Dear Colleague Letter: Developing and Testing New Methodologies for STEM Learning Research, Research Syntheses, and Evaluation](#)

Research Development & Grant Writing News

The National Science Foundation's (NSF's) Directorate for Education and Human Resources (EHR) wishes to notify the community of its intention to support, through the EHR Core Research (ECR) program solicitation [NSF 19-508](#), methodological research and synthesis projects that help grow the community's collective capacity to conduct rigorous research and evaluation on science, technology, engineering and mathematics (STEM) learning and learning environments, workforce development, and broadening participation.

With this Dear Colleague Letter (DCL), ECR invites proposals on the development, application, and extension of formal models and methodologies for STEM learning research, research synthesis (including meta-analysis and meta-synthesis), and evaluation. Submissions might propose: fundamental research to develop and test new methodologies that support valid inferences in STEM learning; research on methods for improving statistical modeling, qualitative modeling, measurement, replication, and learning analytics; or research on methodological aspects of new or existing procedures for data collection, curation, and inference in STEM learning.

Proposers must demonstrate how advances in the methodology will support important theoretical insights in STEM learning and education research, knowledge synthesis and diffusion, or evaluation. Examples of areas for research include, but are not limited to:

- Computational methodologies include advances in Bayesian or computational modeling of STEM education data, computational methodologies for the analysis of video data, machine learning and learning analytics, as well as scientometrics and citation analysis;
- Qualitative methodologies include advances in qualitative research design, the study of validity, meta-synthesis, and the study of linguistic analysis applied to STEM education; and
- Quantitative methodologies include advances in experimental design in field settings, the study of validity (internal, external and measurement validities), the measurement and study of growth, mediation and moderation of treatment effects, meta-analysis, network analysis, and the replication of research results.

In addition, NSF is interested in supporting synthesis projects, meta-analyses, conference proposals, and Early Concept Grants for Exploratory Research (EAGER) proposals that help grow the community's collective capacity to conduct rigorous research and evaluation on STEM learning and learning environments, workforce development, and broadening participation.

- **Synthesis** proposals seek support for the synthesis and/or meta-analysis of existing knowledge on a topic of critical importance to STEM learning and/or education, or for the diffusion of research-based knowledge. Investigators are permitted to propose conferences and other meetings as one of the means of completing the syntheses and diffusing the research-based knowledge that is developed. Additional emphasis will be placed on the proposed dissemination plan.
- **Conference** proposals seek support to conduct well-focused conferences related to the goals of the program. Investigators are strongly encouraged to contact a program officer prior to submission to discuss their ideas.
- The **EAGER** funding mechanism may be used to support exploratory work in its early stages on untested, but potentially transformative, research ideas or approaches. This work may be considered especially "high risk-high payoff" in the sense that it, for example, involves radically different approaches, applies new expertise, or engages

Research Development & Grant Writing News

novel disciplinary or interdisciplinary perspectives. Potential investigators must contact an NSF program officer whose expertise is most germane to the proposal topic prior to submission of an EAGER proposal.

The deadlines for submission of proposals to [NSF 19-508](#) are January 24, 2019, October 3, 2019, and the first Thursday in October annually thereafter. Conference and EAGER proposals may be submitted throughout the year. When responding to this DCL, please begin your proposal title with "ECR Methods DCL:". Submissions should follow the [NSF Proposal & Award Policies & Procedures Guide](#) (PAPPG) and the guidelines in ECR solicitation [NSF 19-508](#).

Dear Colleague Letter: Fundamental Research on Equity, Inclusion, and Ethics in Postsecondary Academic Workplaces and the Academic Profession within the EHR Core Research Program

The National Science Foundation's (NSF) Directorate for Education and Human Resources (EHR) wishes to notify the community of its intention to support, through the EHR Core Research (ECR) program solicitation [NSF 19-508](#), fundamental research on equity, inclusion, and/or ethics for science, technology, engineering and mathematics (STEM) faculty. Proposers are encouraged to explore a wide range of fundamental research projects on equity, inclusion, and/or ethical issues for STEM faculty in postsecondary STEM academic workplaces and academic professions. Examples of areas for research include, but are not limited to:

- Fundamental theoretical constructs about equity, inclusion and/or ethics in STEM academic workplaces and the academic profession and diversity and innovation in STEM research and teaching;
- The implications for equity, inclusion and/or ethical issues within the STEM academic workforce of national and global changes in the academic professions, such as reductions in the numbers of full-time, tenure track and tenured faculty, and increases in part-time, contingent, term, adjunct, and teaching- or research- only faculty;
- The similarities and differences in equity, inclusion and/or ethical issues for STEM faculty among the range of different types of academic organizations (community colleges, minority-serving institutions, predominantly undergraduate institutions, doctoral universities, etc.);
- Reliable and valid metrics of equitable, inclusive and/or ethical culture and climate in STEM academic, organizational and professional contexts;
- The societal and organizational characteristics that influence perceptions of equity, inclusion, and/or ethics by those in the STEM academic workforce and those in the pool of potential academic professionals (e.g., barriers to broadening participation and the effectiveness of mitigation efforts);
- The perception of equity, inclusion and ethical issues on STEM faculty academic career outcomes, work-life balance, and scientific discovery and innovation;
- Fundamental research on how people recognize, reason about, experience and respond to issues of equity, inclusion, and/or ethics in STEM academic workplaces and academic professions; and

Research Development & Grant Writing News

- Fundamental research into the cognitive, affective, social and cultural consequences of ethical phenomena on human development and STEM educational and workforce outcomes.

As described in [ECR solicitation NSF 19-508](#), a wide range of research activities may be supported. Fundamental research may involve the collection of new data and/or secondary analyses that leverage extant state, national, international or other databases. Proposals from early-career investigators and researchers who may not have previously recognized the relevance of their work to STEM education, including policy researchers, behavioral economists, organizational scientists, and other STEM researchers, are especially encouraged.

In addition, NSF is interested in supporting synthesis, conference, and Research Coordination Network proposals related to research on equity, inclusion, and/or ethics in the STEM academic professions.

Synthesis proposals seek support for the synthesis and/or meta-analysis of existing knowledge on a topic of critical importance to STEM learning and/or education, or for the diffusion of research-based knowledge. Investigators are encouraged to propose conferences and other meetings as one of the means of completing the syntheses and diffusing the research-based knowledge that is developed. Additional emphasis will be placed on the proposed dissemination plan.

Conference proposals seek support to conduct well-focused conferences related to the goals of the program. Investigators are strongly encouraged to contact a program officer prior to submission to discuss their ideas.

Research Coordination Network (RCN) proposals submitted to ECR via this DCL provide an opportunity for researchers from different disciplinary perspectives studying equity, inclusion and/or ethics in STEM academics to communicate their research and to synthesize investigations of key problems, ideas and practices. RCN proposals must follow the format and submission procedures established in the [RCN solicitation NSF 17-594](#).

The deadlines for submission of proposals to NSF 19-508 are January 24, 2019, October 3, 2019, and the first Thursday in October annually thereafter. When responding to this DCL, please begin your proposal title with "ECR EIE DCL:". Submissions should follow the [NSF Proposal & Award Policies & Procedures Guide](#) (PAPPG) and the guidelines in [ECR solicitation NSF 19-508](#).

Research Development & Grant Writing News

Agency Reports, Workshops & Research Roadmaps

([Back to Page 1](#))

Climate Communications Initiative Strategic Plan

In 2018, the National Academies launched the Climate Communications Initiative (CCI) to better leverage and unlock the storehouse of climate-related work from across the institution to more effectively meet and anticipate the needs of decision makers at all levels of society. An external Advisory Committee, together with a large internal staff team, have developed a strategic plan for the CCI to guide the National Academies' efforts moving forward.

Science and Engineering for Grades 6-12: Investigation and Design at the Center

It is essential for today's students to learn about science and engineering in order to make sense of the world around them and participate as informed members of a democratic society. The skills and ways of thinking that are developed and honed through engaging in scientific and engineering endeavors can be used to engage with evidence in making personal decisions, to participate responsibly in civic life, and to improve and maintain the health of the environment, as well as to prepare for careers that use science and technology (free pdf download above URL).

The majority of Americans learn most of what they know about science and engineering as middle and high school students. During these years of rapid change for students' knowledge, attitudes, and interests, they can be engaged in learning science and engineering through schoolwork that piques their curiosity about the phenomena around them in ways that are relevant to their local surroundings and to their culture. Many decades of education research provide strong evidence for effective practices in teaching and learning of science and engineering. One of the effective practices that helps students learn is to engage in science investigation and engineering design. Broad implementation of science investigation and engineering design and other evidence-based practices in middle and high schools can help address present-day and future national challenges, including broadening access to science and engineering for communities who have traditionally been underrepresented and improving students' educational and life experiences.

Science and Engineering for Grades 6-12: Investigation and Design at the Center revisits *America's Lab Report: Investigations in High School Science* in order to consider its discussion of laboratory experiences and teacher and school readiness in an updated context. It considers how to engage today's middle and high school students in doing science and engineering through an analysis of evidence and examples. This report provides guidance for teachers, administrators, creators of instructional resources, and leaders in teacher professional learning on how to support students as they make sense of phenomena, gather and analyze data/information, construct explanations and design solutions, and communicate reasoning to self and others during science investigation and engineering design. It also provides guidance to help educators get started with designing, implementing, and assessing investigation and design.

New Funding Opportunities

([Back to Page 1](#))

Content Order

New Funding Posted Since January 15 Newsletter
URL Links to New & Open Funding Solicitations
Solicitations Remaining Open from Prior Issues of the Newsletter
Open Solicitations and BAAs

[User Note: URL links are active on date of publication, but if a URL link breaks or changes a Google search on the key words will typically take you to a working link. Also, entering a grant title and/or solicitation number in the Grants.gov search box will work as well.]

New Funding Solicitations Posted Since January 15 Newsletter

[Systems Biology Enabled Research on the Roles of Microbiomes In Nutrient Cycling Processes](#)

The DOE SC program in Biological and Environmental Research (BER) hereby announces its interest in receiving applications for research within the Genomic Science Program (GSP) (<http://genomicscience.energy.gov>) mission-space. This FOA solicits applications for: i.) systems biology studies on regulatory, metabolic, and signaling networks of microbes, microbial consortia, and microbe-plant interactions involved in biogeochemical cycling of nutrients; and ii.) development and application of -omics approaches to investigate microbial community processes involved in biogeochemical nutrient cycling in terrestrial ecosystems. All research supported from awards under this FOA is intended to benefit the public through increasing our understanding of the physical universe. **Preapplication due March 13; full May 17.**

[Genomics-Enabled Plant Biology for Determination of Gene Function](#)

The DOE SC program in Biological and Environmental Research (BER) hereby announces its interest in receiving applications focused on genomics-based research and technological innovation that will lead to transformative approaches to determine and validate gene function. This FOA solicits applications for systems biology research on plant genomes, gene systems, and molecular processes within the DOE BER mission-space of research in bioenergy and the environment. Innovative combinations of 'omics (e.g., genomics, epigenomics, transcriptomics, proteomics, metabolomics, phenomics, etc.) and computational methodologies to deduce gene function that integrate multiple disciplines, including more traditional fields of plant biology, are strongly encouraged. DOE BER is interested in supporting research that will significantly move forward functional characterization and validation of the vast amounts of genomic information in plants studied by other BER-supported researchers. This FOA is intended to create a public benefit by increasing knowledge of our physical universe and widely disseminating that knowledge. **Preapplication due March 13; full May 17.**

Research Development & Grant Writing News

[2019 Fulbright-Hays Doctoral Dissertation Research Abroad \(DDRA\) Fellowship Program](#)

The Fulbright-Hays DDRA Fellowship Program provides opportunities to doctoral candidates to engage in dissertation research abroad in modern foreign languages and area studies. The program is designed to contribute to the development and improvement of the study of modern foreign languages and area studies in the United States. This notice relates to the approved information collection under OMB control number 1840-0005. **Due March 26.**

[2019 for the Fulbright-Hays Group Projects Abroad \(GPA\) Program](#)

The purpose of the Fulbright-Hays GPA Program is to promote, improve, and develop modern foreign languages and area studies at varying levels of education. The program provides opportunities for faculty, teachers, and undergraduate and graduate students to conduct individual and group projects overseas to carry out research and study in the fields of modern foreign languages and area studies. This notice relates to the approved information collection under OMB control number 1840-0792. **Due March 25.**

[DOE New Bioimaging Approaches for Bioenergy](#)

BER's Bioimaging Research effort supports fundamental research to enable the development of novel bioimaging and characterization technologies for non-destructive in situ imaging, and measuring and modeling of key metabolic processes in and among living plant and microbial systems relevant to bioenergy and environmental research. The current program focuses on a range of optical systems configured with multifunctional techniques to image biological processes in vivo. These efforts include, but are not limited to, multimodal optical, fluorescence, Raman-based and other microscopy capabilities for in vivo imaging of plant and microbial systems. Additional functionality is enhanced through judicious probe and/or sensor development targeted to specific processes and/or metabolic pathways of interest in these systems. Combining probes and/or sensors in association with imaging techniques would help further define specific biochemical steps and/or substrates, metabolites, enzymes, and regulatory molecules within a biological process or metabolic pathway of interest. This information is often crucial for validating hypotheses of cellular metabolism or engineered pathway optimization. However, different biological macromolecules catalyzing metabolic and/or transport reactions exist in spatially defined or membrane-bound regions within the cell. A major challenge is to understand how metabolic pathways are organized within topological constraints at the subcellular scale within living systems. Techniques to understand the structure, function, and location of these macromolecules is key towards developing a better understanding of the spatiotemporal dependence of metabolic processes in biological systems at cellular and subcellular levels. **Preapplication April 4; full May 20.**

[Cyberinfrastructure for Sustained Scientific Innovation \(CSSI\): Elements and Framework Implementations](#)

The Cyberinfrastructure for Sustained Scientific Innovation (CSSI) umbrella program seeks to enable funding opportunities that are flexible and responsive to the evolving and emerging needs in cyberinfrastructure. This program continues the CSSI program by removing the distinction between software and data elements/framework implementations, and instead

Research Development & Grant Writing News

emphasizing integrated cyberinfrastructure services, quantitative metrics with targets for delivery and usage of these services, and community creation. **Due April 8.**

[Improving Undergraduate STEM Education: Computing in Undergraduate Education \(IUSE: CUE\)](#)

Increasingly, undergraduate computer science (CS) programs are being called upon to prepare larger and more diverse student populations for careers in both CS and non-CS fields, including careers in scientific and non-scientific disciplines. Many of these students aim to acquire the understandings and competencies needed to learn how to use computation collaboratively across different contexts and challenging problems. However, standard CS course sequences do not always serve these students well. With this solicitation, NSF will support teams of Institutions of Higher Education (IHEs) in re-envisioning the role of computing in interdisciplinary collaboration within their institutions. In addition, NSF will encourage partnering IHEs to use this opportunity to integrate the study of ethics into their curricula, both within core CS courses and across the relevant interdisciplinary application areas. **Due April 9.**

[DOJ Graduate Research Fellowship in Science, Technology, Engineering, and Mathematics](#)

The Graduate Research Fellowship in Science, Technology, Engineering, and Mathematics (GRF-STEM) program provides awards to accredited academic institutions to support graduate research leading to doctoral degrees in topic areas that are relevant to preventing and controlling crime, and ensuring the fair and impartial administration of criminal justice in the United States. Applicant academic institutions sponsoring doctoral students are eligible to apply only if:

1. The doctoral student's degree program is in a science, technology, engineering, or mathematics (STEM) discipline; and
2. The student's proposed dissertation research has demonstrable implications for addressing the challenges of preventing or controlling crime and/or the fair and impartial administration of criminal justice in the United States. **Due April 17.**

[Distributed Array of Small Instruments \(DASI\)](#)

The Distributed Arrays of Small Instruments (DASI) solicitation is designed to address the increasing need for high spatial and temporal resolution measurements to determine the local, regional, and global scale processes that are essential for addressing the fundamental questions in solar and space physics. This solicitation will be formally divided into two tracks: 1) development of instrumentation for future deployment in arrays and 2) deployment and operation of existing instruments in distributed arrays. This DASI solicitation emphasizes both strong scientific merit and a well-developed plan for student training and involvement of a diverse workforce. **Due April 19.**

[Harnessing the Data Revolution \(HDR\): Institutes for Data-Intensive Research in Science and Engineering - Frameworks \(I-DIRSE-FW\)](#)

In 2016, the National Science Foundation (NSF) unveiled a set of "Big Ideas," 10 bold, long-term research and process ideas that identify areas for future investment at the frontiers of science and engineering (see https://www.nsf.gov/news/special_reports/big_ideas/index.jsp). The Big

Research Development & Grant Writing News

Ideas represent unique opportunities to position our Nation at the cutting edge of global science and engineering leadership by bringing together diverse disciplinary perspectives to support convergence research. As such, when responding to this solicitation, even though proposals must be submitted to CISE/OAC, once received, the proposals will be managed by a cross-disciplinary team of NSF Program Directors.

NSF's Harnessing the Data Revolution (HDR) Big Idea is a national-scale activity to enable new modes of data-driven discovery that will allow fundamental questions to be asked and answered at the frontiers of science and engineering. Through this NSF-wide activity, HDR will generate new knowledge and understanding, and accelerate discovery and innovation. The HDR vision is realized through an interrelated set of efforts in:

- Foundations of data science;
- Algorithms and systems for data science;
- Data-intensive science and engineering;
- Data cyberinfrastructure; and
- Education and workforce development.

Each of these efforts is designed to amplify the intrinsically multidisciplinary nature of the emerging field of data science. The HDR Big Idea will establish theoretical, technical, and ethical frameworks that will be applied to tackle data-intensive problems in science and engineering, contributing to data-driven decision-making that impacts society. **Due May 7.**

[A Science of Science Policy Approach to Analyzing and Innovating the Biomedical Research Enterprise \(SCISIPBIO\)](#)

The National Science Foundation (NSF) and the National Institutes of Health (NIH) are interested in proposals that will propel our understanding of the biomedical research enterprise by drawing from the scientific expertise of the science of science policy research community. NSF promotes the progress of science by maintaining the general health of research and education across all fields of science and engineering. The Social, Behavioral, and Economic Sciences (SBE) Directorate within the NSF supports basic research on people and society. The SBE sciences focus on human behavior and social organizations and how social, economic, political, cultural, and environmental forces affect the lives of people from birth to old age and how people in turn shape those forces. SBE's Science of Science and Innovation Policy (SciSIP) program supports research designed to advance the scientific basis of science and innovation policy.

The NIH is the U.S. Federal agency charged with supporting biomedical research in the U.S. The National Institute of General Medical Sciences (NIGMS) within the NIH supports basic biomedical research that increases understanding of biological processes and lays the foundation for advances in disease diagnosis, treatment, and prevention.

Both the NSF and NIH believe that there are opportunities and needs in building and supporting research projects with a focus on the scientific research enterprise. The two agencies also recognize that when programmatic goals are compatible, coordinated management and funding of a research program can have a positive synergistic effect on the level and scope of research and can leverage the investments of both agencies.

Therefore, NIGMS and SBE are partnering to enable collaboration in research between the SciSIP program and NIGMS. This partnership will result in a portfolio of high quality research

Research Development & Grant Writing News

to provide scientific analysis of important aspects of the biomedical research enterprise and efforts to foster a diverse, innovative, productive and efficient scientific workforce, from which future scientific leaders will emerge.

Prospective investigators are strongly encouraged to discuss their proposals with the cognizant Program Officers before submission to determine project relevance to the priorities of both SBE and NIGMS. Specific questions pertaining to this solicitation can also be directed to the cognizant Program Officers. **Due May 8.**

Growing Convergence Research (GCR)

Growing Convergence Research (GCR) at the National Science Foundation was identified as one of 10 Big Ideas. Convergence research is a means for solving vexing research problems, in particular, complex problems focusing on societal needs. It entails integrating knowledge, methods, and expertise from different disciplines and forming novel frameworks to catalyze scientific discovery and innovation.

GCR identifies [Convergence Research](#) as having two primary characteristics:

- *Research driven by a specific and compelling problem.* Convergence Research is generally inspired by the need to address a specific challenge or opportunity, whether it arises from deep scientific questions or pressing societal needs.
- *Deep integration across disciplines.* As experts from different disciplines pursue common research challenges, their knowledge, theories, methods, data, research communities and languages become increasingly intermingled or integrated. New frameworks, paradigms or even disciplines can form sustained interactions across multiple communities.

A distinct characteristic of convergence research, in contrast to other forms of multidisciplinary research, is that from the inception, the convergence paradigm *intentionally* brings together intellectually diverse researchers and stakeholders to frame the research questions, develop effective ways of communicating across disciplines and sectors, adopt common frameworks for their solution, and, when appropriate, develop a new scientific vocabulary. Research teams practicing convergence aim at developing sustainable relationships that may not only create solutions to the problem that engendered the collaboration, but also develop novel ways of framing related research questions and open new research vistas.

This GCR solicitation targets multi-disciplinary team research that crosses directorate or division boundaries and is currently not supported by NSF programs, initiatives and research-focused Big Ideas. Proposers must make a convincing case that the research to be conducted is within NSF's purview and cannot be supported by existing NSF programs and multidisciplinary initiatives. Proposals involving convergence in areas covered by existing programs and solicitations will be returned without review.

The proposers should outline a five-year research plan delineated in two phases, Phase I: years 1-2, and Phase II: years 3-5. Successful proposals will be funded initially for two years and then each team's progress will be evaluated based on a report and presentation that the team will make to a panel of reviewers at NSF. Teams that show significant progress during the first two years will receive funding for an additional three years. Interested researchers may request up to \$1,200,000 total for the first two years and \$2,400,000 for the last three years.

Due May 8.

Research Development & Grant Writing News

URL Links to New & Open Funding Solicitations

Links verified June 8, 2018

- [SAMHSA FY 2017 Grant Announcements and Awards](#)
- [Open Solicitations from IARPA \(Intelligence Advanced Research Projects Activity\)](#)
- [Bureau of Educational and Cultural Affairs, Open Solicitations, DOS](#)
- [ARPA-E Funding Opportunity Exchange](#)
- [DOE Funding Opportunity Exchange](#)
- [NPS Broad Agency Announcements \(BAAs\)](#)
- [NIJ Current Funding Opportunities](#)
- [NIJ Forthcoming Funding Opportunities](#)
- [Engineering Information Foundation Grant Program](#)
- [Comprehensive List of Collaborative Funding Mechanisms, NORDP](#)
- [ARL Funding Opportunities — Open Broad Agency Announcements \(BAA\)](#)
- [NASA Open Solicitations](#)
- [CDMRP FY 2018 Funding Announcements](#)
- [DOE/EERE Funding Opportunity Exchange](#)
- [New Funding Opportunities at NIEHS \(NIH\)](#)
- [National Human Genome Research Institute Funding Opportunities](#)
- [Office of Naval Research Currently Active BAAs](#)
- [HRSA Health Professions Open Opportunities](#)
- [Foundation Center RFP Weekly Funding Bulletin](#)

Solicitations Remaining Open from Prior Issues of the Newsletter

Future of Work at the Human-Technology Frontier: Core Research (FW-HTF)

The specific objectives of the Future of Work at the Human-Technology Frontier program are (1) to facilitate convergent research that employs the joint perspectives, methods, and knowledge of computer science, engineering, learning sciences, research on education and workforce training, and social, behavioral, and economic sciences; (2) to encourage the development of a research community dedicated to designing intelligent technologies and work organization and modes inspired by their positive impact on individual workers, the work at hand, the way people learn and adapt to technological change, creative and supportive workplaces (including remote locations, homes, classrooms, or virtual spaces), and benefits for social, economic, and environmental systems at different scales; (3) to promote deeper basic understanding of the interdependent human-technology partnership to advance societal needs by advancing design of intelligent work technologies that operate in harmony with human workers, including consideration of how adults learn the new skills needed to interact with these technologies in the workplace, and by enabling broad workforce participation, including improving accessibility for those challenged by physical or cognitive impairment; and (4) to understand, anticipate, and explore ways of mitigating potential risks arising from future work at the human-technology frontier. **Due March 6.**

Research Development & Grant Writing News

Improving Undergraduate STEM Education: Hispanic-Serving Institutions (HSI Program)

The Improving Undergraduate STEM Education: Hispanic-Serving Institutions (HSI Program) seeks to enhance the quality of undergraduate STEM education at HSIs and to increase retention and graduation rates of undergraduate students pursuing degrees in science, technology, engineering, and mathematics (STEM) at HSIs. In addition, the HSI Program seeks to build capacity in undergraduate STEM education at HSIs that typically do not receive high levels of NSF grant funding. The National Science Foundation (NSF) established the HSI Program in response to the Consolidated Appropriations Act, 2017 (P.L. 115-31) and the American Innovation and Competitiveness Act (P.L. 114-329). The HSI Program is aligned with NSF's commitment to increase access for underrepresented groups to the Nation's STEM enterprise. In designing the HSI Program, NSF sought community input by several mechanisms (<https://nsf.gov/ehr/HSIProgramPlan.jsp>) and has continued to gather community input to inform future components of, or modifications to, the HSI Program. **Webinar.** The HSI Program team, in collaboration with the NSF Division of Grants and Agreement (DGA), will host webinars after the release of this solicitation. Key features and expectations of the HSI Program as well as guidance on proposal preparation and submission will be discussed with potential PIs and their authorized organizational representatives responsible for submitting proposals to the HSI Program. Information regarding the webinar will be posted to the HSI Program webpage: <https://nsf.gov/ehr/HSIProgramPlan.jsp>. **Due March 6.**

NOAA-OAR-OWAQ-2019-2005820 FY2019 Office of Weather and Air Quality Research Programs

There will be eight grant competitions from this notification valued at approximately \$16,200,000 as follows: 1) High Impact Weather Testbeds, 2) Joint Technology Transfer Initiative (JTTI), 3) Air Quality Research and Forecasting, 4) Verification of the Origins of Rotation in Tornadoes Experiment - Southeast U.S. (VORTEX-SE), 5) Infrasound Detection of Tornadoes and High Impact Weather, 6) Next Generation of Mesoscale Weather Observing Platforms, 7) Snowpack and Soil Moisture Observations and Data Assimilation to Improve the National Water Model (NWM), and 8) Subseasonal to Seasonal (S2S).

These eight competitions in this notification of funding opportunity reflect multiple science objectives spanning time scales from the very short-term (hours) to seasonal and from weather and water observations and modeling to social and behavioral science. It is focused on improving NOAA's understanding and ultimately its weather and water forecasting services through engagement with the external scientific community on key science gaps of mutual interest through funded grant opportunities.

One of the key themes is supporting applied research and development that leads to the demonstration in NOAA's testbeds during the project period of new high impact weather, water, and air quality observing and forecasting applications, including new data or products, improved analysis techniques, better statistical or dynamic forecast models and techniques, and communication of that information to better inform the public. It is expected that NOAA's support of these new capabilities will speed the transition of this new research into operations in order to improve NOAA weather and water services for the public. **Due March 20.**

Research Development & Grant Writing News

[Harnessing the Data Revolution \(HDR\): Institutes for Data-Intensive Research in Science and Engineering - Ideas Labs](#)

In 2016, the National Science Foundation (NSF) unveiled a set of “Big Ideas,” 10 bold, long-term research and process ideas that identify areas for future investment at the frontiers of science and engineering (see https://www.nsf.gov/news/special_reports/big_ideas/index.jsp). The Big Ideas represent unique opportunities to position our Nation at the cutting edge of global science and engineering leadership by bringing together diverse disciplinary perspectives to support convergence research. As such, when responding to this [solicitation](#), even though proposals must be submitted to the Directorate for Computer & Information Science & Engineering/Office of Advanced Cyberinfrastructure(CISE/OAC), once received, the proposals will be managed by a cross-disciplinary team of NSF Program Directors. NSF’s [Harnessing the Data Revolution \(HDR\) Big Idea](#) is a national-scale activity to enable new modes of data-driven discovery that will allow fundamental questions to be asked and answered at the frontiers of science and engineering. Through this NSF-wide activity, HDR will generate new knowledge and understanding, and accelerate discovery and innovation. The HDR vision is realized through an interrelated set of efforts in:

- Foundations of data science;
- Algorithms and systems for data science;
- Data-intensive science and engineering;
- Data cyberinfrastructure; and
- Education and workforce development.

Each of these efforts is designed to amplify the intrinsically multidisciplinary nature of the emerging field of data science. The HDR Big Idea will establish theoretical, technical, and ethical frameworks that will be applied to tackle data-intensive problems in science and engineering, contributing to data-driven decision-making that impacts society. This solicitation describes one or more Ideas Lab(s) on Data-Intensive Research in Science and Engineering (DIRSE) as part of the HDR Institutes activity. **Due June 19.**

[Materials Research Science and Engineering Centers \(MRSEC\)](#)

There are a few minor differences between this and the previous ([NSF 16-545](#)) solicitation. These include:

1. Interdisciplinary Research Groups topics focusing on the NSF Big Ideas are included as suggested research topics;
2. For both preliminary and full proposals, MRSEC participant definitions are clarified and made uniform: it changed from using senior investigator, senior participants and others to clearer definitions for supported and unsupported Participants including Primary and Secondary Participants and more (see text);
3. For Preliminary proposals, only biographical sketches for those individuals listed in the NSF Proposal Cover Sheet (up to five) are required; other biographical sketches will not be accepted;
4. For both Preliminary and Full Proposal, Results from Prior NSF Support can only be reported for individuals, up to five, that appear on the NSF Cover Sheet; results for other participants must not be included;

Research Development & Grant Writing News

5. Proposers are encouraged to contact the Program Director(s) prior to submission to ascertain that the Interdisciplinary Research Group (IRG) proposed research fits the Division of Materials Research (DMR) portfolio.

The Materials Research Science and Engineering Centers (MRSECs) program provides sustained support of interdisciplinary materials research and education of the highest quality while addressing fundamental problems in science and engineering. Each MRSEC addresses research of a scope and complexity requiring the scale, synergy, and multidisciplinary provided by a campus-based research center. The MRSECs support materials research infrastructure in the United States, promote active collaboration between universities and other sectors, including industry and international organizations, and contribute to the development of a national network of university-based centers in materials research, education, and facilities. A MRSEC may be located at a single institution, or may involve multiple institutions in partnership, and is composed of up to three Interdisciplinary Research Groups, IRGs, each addressing a fundamental materials science topic aligned with the Division of Materials Research, DMR. **Preliminary due June 24; full by invitation November 26.**

Open Solicitations and BAAs

[BAA's remain open for one or more years. During the open period, agency research priorities may change or other **modifications are made to a published BAA**. If you are submitting a proposal in response to an open solicitation, as below, check for modifications to the BAA at Grants.gov or by utilizing [Modified Opportunities by Agency](#) to receive a Grants.gov notification of recently modified opportunities by agency name.]

[FA9550-18-S-0003 Research Interests of the Air Force Office of Scientific Research](#)

AFOSR plans, coordinates, and executes the Air Force Research Laboratory's (AFRL) basic research program in response to technical guidance from AFRL and requirements of the Air Force. Additionally, the office fosters, supports, and conducts research within Air Force, university, and industry laboratories; and ensures transition of research results to support U.S. Air Force needs. The focus of AFOSR is on research areas that offer significant and comprehensive benefits to our national war fighting and peacekeeping capabilities. These areas are organized and managed in two scientific Departments: Engineering and Information Science (RTA) and Physical and Biological Sciences (RTB). The research activities managed within each Department are summarized in this section. **Open Until Superseded.**

[PAR-16-242 Bioengineering Research Grants \(BRG\) \(R01\) Department of Health and Human Services National Institutes of Health](#)

The purpose of this funding opportunity announcement is to encourage collaborations between the life and physical sciences that: 1) apply a multidisciplinary bioengineering approach to the solution of a biomedical problem; and 2) integrate, optimize, validate, translate or otherwise accelerate the adoption of promising tools, methods and techniques for a specific research or clinical problem in basic, translational, or clinical science and practice. An application may propose design-directed, developmental, discovery-driven, or hypothesis-driven research and is

Research Development & Grant Writing News

appropriate for small teams applying an integrative approach to increase our understanding of and solve problems in biological, clinical or translational science. **Open to May 9, 2019.**

[BAA-RQKD-2014-0001 Open Innovation and Collaboration Department of Defense Air Force -- Research Lab](#)

Open innovation is a methodology to capitalize on diverse, often non-traditional talents and insights, wherever they reside, to solve problems. Commercial industry has proven open innovation to be an effective and efficient mechanism to overcome seemingly impossible technology and/or new product barriers. AFRL has actively and successfully participated in collaborative open innovation efforts. While these experiences have demonstrated the power of open innovation in the research world, existing mechanisms do not allow AFRL to rapidly enter into contractual relationships to further refine or develop solutions that were identified. This BAA will capitalize on commercial industry experience in open innovation and the benefits already achieved by AFRL using this approach. This BAA will provide AFRL an acquisition tool with the flexibility to rapidly solicit proposals through Calls for Proposals and make awards to deliver innovative technical solutions to meet present and future compelling Air Force needs as ever-changing operational issues become known. The requirements, terms and specific deliverables of each Call for Proposals will vary depending on the nature of the challenge being addressed. It is anticipated that Call(s) for Proposals will address challenges in (or the intersection between) such as the following technology areas: Materials: - Exploiting material properties to meet unique needs - Material analysis, concept / prototype development, and scale up Manufacturing Processes that enable affordable design, production and sustainment operations Aerospace systems: - Vehicle design, control, and coordinated autonomous and/or manned operations - Power and propulsion to enable next generation systems Human Effectiveness: - Methods and techniques to enhance human performance and resiliency in challenging environments - Man – Machine teaming and coordinated activities Sensors and Sensing Systems: - Sensor and sensing system concept development, design, integration and prototyping - Data integration and exploitation. **Open to July 12, 2019.**

[HDTRA1-14-24-FRCWMD-BAA Fundamental Research to Counter Weapons of Mass Destruction](#)

** Fundamental Research BAA posted on 20 March 2015.** Potential applicants are strongly encouraged to review the BAA in its entirety. **Please note that ALL general correspondence for this BAA must be sent to HDTRA1-FRCWMD-A@dtra.mil. Thrust Area-specific correspondence must be sent to the applicable Thrust Area e-mail address listed in Section 7: Agency Contacts.** **Open to Sept. 30, 2019.**

[FY 2019 Continuation of Solicitation for the Office of Science Financial Assistance Program](#) **Open to September 30.**

[BAA-RQKH-2015-0001 Methods and Technologies for Personalized Learning, Modeling and Assessment Air Force -- Research Lab](#)

The Air Force Research Laboratories and 711th Human Performance Wing are soliciting white papers (and later technical and cost proposals) on the following research effort. This is an open

Research Development & Grant Writing News

ended BAA. The closing date for submission of White Papers is 17 Nov 2019. This program deals with science and technology development, experimentation, and demonstration in the areas of improving and personalizing individual, team, and larger group instructional training methods for airmen. The approaches relate to competency definition and requirements analysis, training and rehearsal strategies, and models and environments that support learning and proficiency achievement and sustainment during non-practice of under novel contexts. This effort focuses on measuring, diagnosing, and modeling airman expertise and performance, rapid development of models of airman cognition and specifying and validating, both empirically and practically, new classes of synthetic, computer-generated agents and teammates. An Industry Day was held in November 2014. Presentation materials from the Industry Day and Q&A's are attached. If you would like a list of Industry Day attendees, send an email request to helen.williams@us.af.mil **Open until November 17, 2019.**

BAA-AFRL-RQKMA-2016-0007 Air Force Research Laboratory, Materials & Manufacturing Directorate, Functional Materials and Applications (AFRL/RXA) Two-Step Open BAA

Air Force Research Laboratory, Materials & Manufacturing Directorate is soliciting White Papers and potentially technical and cost proposals under this two-step Broad Agency Announcement (BAA) that is open for a period of five (5) years. Functional Materials technologies that are of interest to the Air Force range from materials and scientific discovery through technology development and transition, and support the needs of the Functional Materials and Applications mission. Descriptors of Materials and Manufacturing Directorate technology interests are presented in the context of functional materials core technical competencies and applications. Applicable NAICS codes are 541711 and 541712. **Open to April 20, 2021.**

Army Research Office Broad Agency Announcement for Basic and Applied Scientific Research

This BAA sets forth research areas of interest to the ARO. This BAA is issued under FAR 6.102(d)(2), which provides for the competitive selection of basic and applied research proposals, and 10 U.S.C. 2358, 10 U.S.C. 2371, and 10 U.S.C. 2371b, which provide the authorities for issuing awards under this announcement for basic and applied research. The definitions of basic and applied research may be found at 32 CFR 22.105. Proposals submitted in response to this BAA and selected for award are considered to be the result of full and open competition and in full compliance with the provision of Public Law 98-369, "The Competition in Contracting Act of 1984" and subsequent amendments. **Open to April 30, 2022.**

FA9453-17-S-0005 Research Options for Space Enterprise Technologies (ROSET)

The Air Force Research Laboratory (AFRL) Space Vehicle Directorate (RV) is interested in receiving proposals from all offerors to advance state of the art technology and scientific knowledge supporting all aspects of space systems including payload adapters, on-orbit systems, communications links, ground systems, and user equipment. Efforts will include basic and advanced research, advanced component and technology development, prototyping, and system development and demonstration and will span the range from concept and laboratory experimentation to testing/demonstration in a relevant environment. Specific tasks include design, development, analysis, fabrication, integration, characterization,

Research Development & Grant Writing News

testing/experimentation, and demonstration of hardware and software products. **Open to September 22, 2022.**

Broad Agency Announcement for the Army Rapid Capabilities Office

This Broad Agency Announcement (BAA), W56JSR-18-S-0001, is sponsored by the Army Rapid Capabilities Office (RCO). The RCO serves to expedite critical capabilities to the field to meet Combatant Commanders' needs. The Office enables the Army to experiment, evolve, and deliver technologies in real time to address both urgent and emerging threats while supporting acquisition reform efforts. The RCO executes rapid prototyping and initial equipping of capabilities, particularly in the areas of cyber, electronic warfare, survivability and positioning, navigation and timing (PNT), as well as other priority projects that will enable Soldiers to operate and win in contested environments decisively. This BAA is an expression of interest only and does not commit the Government to make an award or pay proposal preparation costs generated in response to this announcement.

Questions concerning the receipt of your submission should be directed:

<http://rapidcapabilitiesoffice.army.mil/eto/>

Technical questions will be sent to the appropriate Technical Points of Contact (TPOC), topic authors, and/or Subject Matter Experts (SMEs) to request clarification of their areas of interest. No discussions are to be held with offerors by the technical staff after proposal submission without permission of the Army Contracting Command-Aberdeen Proving Ground (ACC-APG) Contracting Officer. **Open to March 23, 2023.**

W911NF-18-S-0005 U.S. Army Research Institute for the Behavioral and Social Sciences Broad Agency Announcement for Basic, Applied, and Advanced Research (Fiscal Years 2018-2023)

The U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) announces the ARI FY18-23 Broad Agency Announcement for Basic, Applied, and Advanced Scientific Research. This Broad Agency Announcement, which sets forth research areas of interest to the United States Army Research Institute for the Behavioral and Social Sciences, is issued under the provisions of paragraph 6.102(d)(2) of the Federal Acquisition Regulation (FAR), which provides for the competitive selection of proposals. Proposals submitted in response to this BAA and selected for award are considered to be the result of full and open competition and in full compliance with the provisions of Public Law 98-369 (The Competition in Contracting Act of 1984) and subsequent amendments. The U.S. Army Research Institute for the Behavioral and Social Sciences is the Army's lead agency for the conduct of research, development, and analyses for the improvement of Army readiness and performance via research advances and applications of the behavioral and social sciences that address personnel, organization, training, and leader development issues. Programs funded under this BAA include basic research, applied research, and advanced technology development that can improve human performance and Army readiness.

Those contemplating submission of a proposal are encouraged to contact the ARI Technical Point of Contact (TPOC) for the respective topic area cited in the BAA. If the R&D warrants further inquiry and funding is available, submission of a proposal will be entertained. The recommended three-step sequence is (1) telephone call to the ARI TPOC or responsible ARI Manager, (2) white paper submission, (3) full proposal submission. Awards may be made in the

Research Development & Grant Writing News

form of contracts, grants, or cooperative agreements. Proposals are sought from educational institutions, non-profit/not-for-profit organizations, and commercial organizations, domestic or foreign, for research and development (R&D) in those areas specified in the BAA. The U.S. Army Research Institute for the Behavioral and Social Sciences encourages Historically Black Colleges and Universities/Minority Serving Institutions (HBCU/MSI) and small businesses to submit proposals for consideration. Foreign owned, controlled, or influenced organizations are advised that security restrictions may apply that could preclude their participation in these efforts. Government laboratories, Federal Funded Research and Development Centers (FFRDCs), and US Service Academies are not eligible to participate as prime contractors or recipients. However, they may be able to participate as subcontractors or Subrecipients (eligibility will be determined on a case by case basis). **Open to April 29, 2023.**

FA8650-17-S-6001 Science and Technology for Autonomous Teammates (STAT)

The objective of Science and Technology for Autonomous Teammates (STAT) program is to develop and demonstrate autonomy technologies that will enable various AF mission sets. This research will be part of Experimentation Campaigns in: 1 -Multi-domain Command and Control; 2-Intelligence, Surveillance, Recognizance (ISR) Processing Exploitation and Dissemination (PED); and 3- Manned-Unmanned combat Teaming to demonstrate autonomy capabilities to develop and demonstrate autonomy technologies that will improve Air Force operations through human-machine teaming and autonomous decision-making. The technology demonstrations that result from this BAA will substantially improve the Air Force's capability to conduct missions in a variety of environments while minimizing the risks to Airmen. The overall impact of integration of autonomous systems into the mission space will enable the Air Force to operate inside of the enemy's decision loop.

STAT will develop and apply autonomy technologies to enhance the full mission cycle, including mission planning, mission execution, and post-mission analysis. Particular areas of interest include multi-domain command and control, manned-unmanned teaming, and information analytics. The technology demonstrations that result from this BAA will substantially improve the Air Force's capability to conduct missions in a variety of environments while minimizing the risks to Airmen. The overall impact of integration of autonomous systems into the mission space will enable the Air Force to operate inside of the enemy's decision loop. This effort plans to demonstrate modular, transferable, open system architectures, and deliver autonomy technologies applicable to a spectrum of multi-domain applications. Development efforts will mature a set of technologies that enable airmen to plan, command, control, and execute missions with manageable workloads. The software algorithms and supporting architectures shall:

- Ingest and understand mission taskings and commander's intent
- Respond appropriately to human direction and orders
- Respond intelligently to dynamic threats and unplanned events

Chosen technologies will be open, reusable, adaptable, platform agnostic, secure, credible, affordable, enduring, and able to be integrated into autonomous systems. The program will be comprised of various technologies developed by AFRL and Industry, integrated into technology demonstrations and deliverables with all the necessary software, hardware, and documentation to support AFRL-owned modeling and simulation environments for future capability developments. Thus, all technology development efforts must adhere to interface designs and standards. **Open to July 23, 2023.**

Research Development & Grant Writing News

Research Development & Grant Writing News

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